MOTOROLA
COMMUNICATIONS
BUYERS GUIDE

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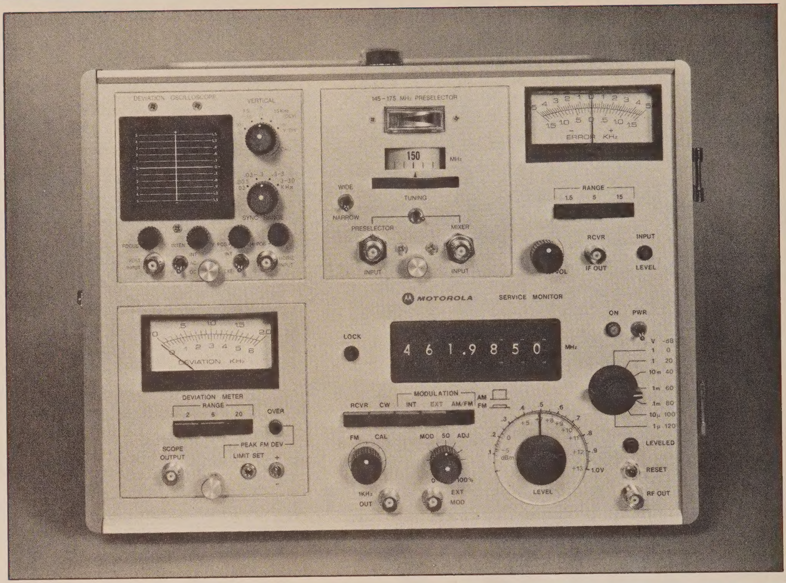
The Parts Department
of the Motorola Communications Group

Test Equipment

You have your choice of the widest variety of test equipment available . . . plus consultants to discuss your particular applications.

R-1200A Series Service Monitor


DEVIATION OSCILLOSCOPE
VERTICAL
SYNC
145-175 MHz PRESELECTOR
150 MHz
WIDE
NARROW
TUNING
PRESELECTOR
MIXER
INPUT
INPUT
ERROR KHz
RANGE
1.5
5
15
RCVR
IF OUT
INPUT
LEVEL
MOTOROLA
SERVICE MONITOR
ON
PWR
LOCK
4 6 1.9 8 5 0
MHz
DEVIATION KHz
DEVIATION METER
RANGE
2
6
20
OVER
SCOPE OUTPUT
PEAK FM DEV
LIMIT SET
MODULATION
RCVR
CW
INT
EXT
AM/FM
AM
FM
FM
CAL
MOD
50
ADJ
1KHz OUT
EXT MOD
LEVEL
LEVELED
RESET
RF OUT

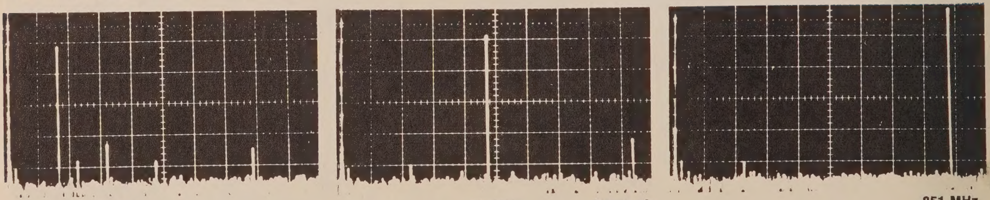
A Complete Servicing System

The R-1200A Series Service Monitor offers the ultimate in an FM service instrument system. Convenient thumbwheel frequency entry on the frequency synthesizer provides continuous frequency coverage from 100 kHz to 999.9999 MHz, all on fundamentals. The frequency range is variable down to 100 Hz. Its advanced design provides the ability to set the synthesizer to 100 Hz increments (4 decimal places) providing direct "dial-up" of the latest 470-512 MHz splinter/tertiary channels. For example, frequencies such as 154.4675 MHz in the special industrial band and 165.0875 MHz in the military band can be set up exactly. Frequency set-up is almost instantaneous. No need to wait for frequencies to stabilize before use.

Pushbutton operation provides speed and simplicity of operation. A push of a button changes the mode of operation from receive to CW, FM, or AM generation. Outputs include single variable RF output, and a variable level 1000 Hz signal for modulating a transmitter while setting deviation. IF signals can be generated at the same RF output connector. The *1 volt* high level RF out lets you get through detuned circuits for fast, efficient receiver servicing.

With the R-1200A you can simultaneously modulate the signal generated with an internal 1000 Hz *and* an external "Private-Line" (PL) tone or "Digital Private-Line" (DPL) code. The ability to measure and observe the deviation on a meter and a scope simultaneously is especially significant. The DPL code can be recovered on the "scope out" connector for use with the SLN-6413A DPL decoder for code verification necessary in DPL servicing. The scope plug-in is also useful as a general purpose scope as it has a *calibrated* input with sensitivity of *1 millivolt* per division. The deviation scope and meter are fully compatible with all DPL systems.

Actual photographs of spectral displays showing fundamental frequencies and their related harmonics.

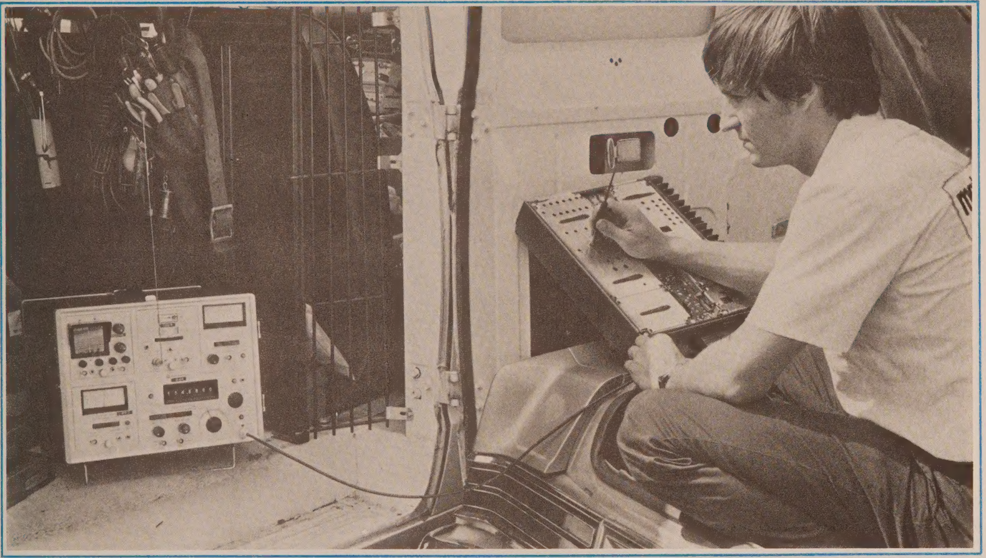


151 MHz Signal — **Harmonic 30 dB Down**

451 MHz Signal — **Harmonic 34 dB**

851 MHz Signal (No visible harmonics)

R-1200A Series Service Monitor



Based on Motorola's years of experience in FM communications technology, the Motorola service monitor is the most advanced instrument of its type available today. It incorporates all the functions required for exact, high resolution deviation and frequency measurements. It will totally support the new 806-960 MHz frequency bands. State-of-the-art, integrated-circuit design and a unique modular building-block concept make the instrument obsolescence proof against future servicing needs and FCC requirements.

Features include:

"Clean" Output Signal—Spurious signals are at least 40 dB below the desired output *at all amplitudes* below 110 MHz and this improves to −50 dB above 110 MHz. Harmonics are at least 25 dB below the fundamental. Purity is not degraded when reducing the amplitude of the desired signal. The output is actually clean enough to drive a counter. This greatly enhances the versatility and utility of the service monitor when used as a signal generator.

High Level Output At All Frequencies—A full 1V rms is available (into a matched 50 ohm load) from below 10 kHz to 999.9999 MHz. The output is leveled. Attenuation is accurate.

All RF Signals From One Connector—Only a single output connector, and a single set of controls, are required for all RF output signals (including IF). Calibration and modulation settings remain valid over the entire range.

Fully Shielded Synthesizer and Receiver—The service monitor does not generate RF spray and is unaffected by ambient RF. Usefulness in the service environment is increased and the integrity of the attenuator setting is further insured.

Electronic Overload Protection — Prevents damage to the synthesizer if an RF (transmitter) or dc source is inadvertently connected to the output connector. A front panel pushbutton provides convenient reset. This eliminates external pads or the need for fuses.

AM, FM, and CW Output—Either internal or external modulation is selected by a convenient front panel switch. AM carrier frequency can be checked at zero modulation.

800 MHz Band Capability—Spectral purity, attenuator accuracy, RF shielding and other features permit the R-1200A to effectively service radios in all frequency bands.

Digital Capability—Both the frequency and amplitude modulators are dc coupled. The deviation scope and meter are fully compatible with digital systems. All recent digital information systems may be serviced.

Multiple Tap Power Transformer — A simple internal jumper plug allows quick selection of the following ac line voltages: 100V, 115V, 125V, 200V, 230V, 250V.

Built-In 13.6V dc Inverter—The entire service monitor may be operated from a service van or other vehicle. So fast, efficient radio servicing may be accomplished in the field.

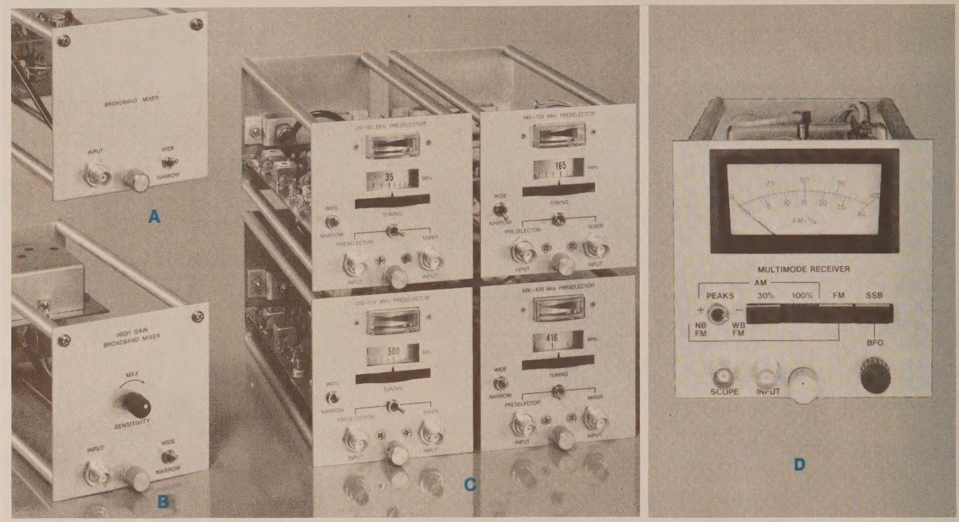
LED Indicators—For long life and reduced maintenance.

Improved Physical Packaging — Removal of two panels, with captive screws, allows access to all internal parts. The various subassemblies are removable individually for service. Quick disconnects are used for all RF and dc leads. The synthesizer module may be reconnected after it is removed from the mainframe, to permit servicing the plug-in circuit boards. A convenient handle is included and edges are rounded. The unit is easy to service and carry.

Rear-Panel-Mounted Heat Sink—Permits dissipation of any internal heat and allows unit to stand on end if necessary.

Rugged—Designed to withstand an exceptional amount of shock and vibration, the service monitor is reliable in a rugged field environment.

Service Monitor Plug-Ins



The Motorola R-1200A Series Service Monitor incorporates a unique modular building-block concept to allow for up to three plug-ins. This capability provides an obsolescence-free instrument which can be updated to meet future needs . . . to expand the usefulness of the instrument by providing auxiliary testing and measuring functions.

Broadband Mixers

These plug-in units provide coverage of the entire RF spectrum from 20 MHz to 990 MHz. A crystal filter in the main receiver provides wide and narrow bandwidths as selected by a panel mounted switch. See RF Pre-selector Plug-ins which also include a broadband feature in addition to increased selectivity over a given bandwidth.

Standard FM Unit

A Sensitivity of the standard unit (SLN-6352A) is 1 millivolt for "in-shop" measurements and is recommended for general service use.

SLN-6352A Standard Broadband Mixer. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).

High Gain Broadband FM Mixer

B The Model SLN-6396A High Gain Broadband Mixer provides better than 20 microvolt sensitivity from 20 MHz to 512 MHz (usable to 990 MHz). An adjustable gain control allows the sensitivity to be adjusted from 1 millivolt, for "in-shop" measurements, to better than 20 microvolts, for "off-the-air" measurements.

Not recommended where high selectivity is required such as in areas of high frequency-congestion.

SLN-6396A High Gain Broadband Mixer. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.97 cm).

R-F, FM Pre-Selector Plug-ins

C Four r-f pre-selector plug-ins are available for "off-the-air" measurements, one for each of the standard FM communications bands; low band VHF, high band VHF, 406-420 MHz UHF and 450-512 MHz UHF. Sensitivity is a nominal twenty microvolts over the rated bandwidth. In addition, each plug-in also incorporates a broadband mixer input (10mV sensitivity) for general service use over the entire 20-990 MHz range completely eliminating the need for a separate broadband mixer plug-in.

SLN-6353A	25-50 MHz pre-selector and wide-band input.
SLN-6354A	145-175 MHz pre-selector and wide-band input.
SLN-6355A	450-512 MHz pre-selector and wide-band input.
SLN-6369A	406-420 MHz pre-selector and wide-band input.

High Sensitivity Broadband AM/FM/SSB Plug-in Receiver Module

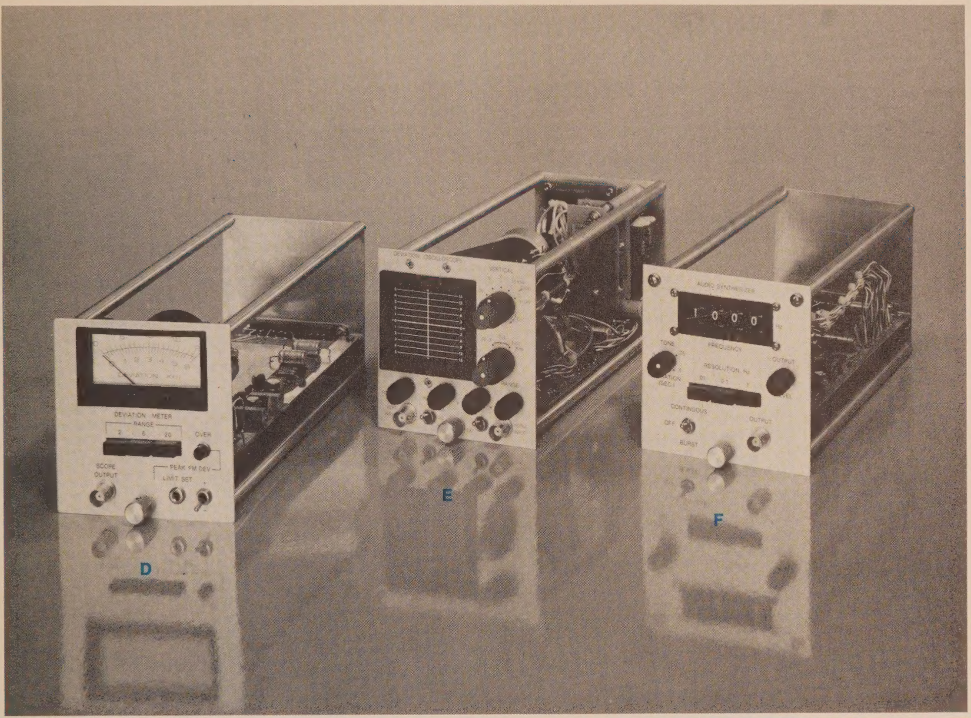
D Simply plug this receiver module into your R-1200 series mainframe and expand your service capabilities to include AM and SSB monitoring. A full array of FM, AM and CW carriers are provided by the mainframe synthesizer.

In the AM mode modulation percent is indicated on a built-in modulation meter on either 30% (for standard EIA tests) or 100% modulation scales. A plus or minus peak selector switch allows you to check for asymmetrical modulation. In the FM mode, operation is identical to that of the broadband mixer plug-ins. The SSB mode allows you to monitor single-sideband transmissions. A beat frequency oscillator (BFO) allows for adjustment of the SSB demodulator frequency for crystal clear audio.

The plug-in receiver module features better than 50 microvolts typical sensitivity for meaningful measurement (better than 25 microvolts in the 15 MHz to 500 MHz range).

The unit is compatible with all R-1200 series mainframes serial number 14001-7 and up. Mainframes with lower serial numbers will require modification to be compatible with the receiver module. Please contact your Motorola test equipment representative for modification procedures.

RTC-4018A Plug-in Receiver Module



Deviation Meter

D The plug-in deviation meter provides direct reading deviation measurements in three ranges, 0-2 kHz, 0-6 kHz, and 0-20 kHz to an accuracy of ±4% of full scale. An indicator light illuminates when peak deviation exceeds pre-set limits. A switch allows you to observe either side of the modulation to check for unbalanced or asymmetrical deviation and a scope output jack is provided for observing instantaneous peak deviation on an external shop scope. DPL compatible.

***RTC-4000A** Meter, deviation unit. Est. shpg. wt. 2½ lbs. (1.13 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).

Multi-Purpose Oscilloscope

E The multi-purpose oscilloscope provides a visual display of the exact deviation. Waveform analysis allows you to diagnose unbalanced modulation, power supply hum, clipping, and other abnormal conditions at a glance. The unit may be used in place of or simultaneously with the deviation meter or may be used independently of monitoring function for other servicing procedures. Unit features variable speed sweep, calibrated attenuator, ac/dc coupling, and high (1 mv/div) sensitivity. DPL compatible.

****RTC-4001A** Scope deviation unit. Est. shpg. wt. 4½ lbs. (2.03 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).

Audio Frequency Synthesizer

F The Model SLN-6381A Audio Frequency Synthesizer provides low frequency signal generation capability for the S-1327 series Service Monitor. The output consists of a low distortion sine wave. Accuracy and stability are related to the 1 MHz oscillator in the Service Monitor main frame by a digital synthesis system. No frequency calibration is required in the plug-in.

The unit provides both a continuous tone mode and a burst mode variable from 0.1 to 1 second. Longer bursts are obtained by simply switching the unit "on" and "off," in the continuous mode, for the desired length of time. Output amplitude is variable up to 3 Vrms into 600 ohms. Resolution of the output frequency varies with the frequency range from 0.01 Hz in the 10 to 99.99 Hz range to 1 Hz in the 1000 to 9999 Hz range . . . more than adequate for checking all common tone code signalling systems. (Note: for example, at 1000 Hz reeds are within spec at ±1½ Hz.) The desired frequency is selected by four convenient thumbwheels.

SLN-6381A Audio frequency synthesizer. Est. shpg. wt. 2 lbs. (.9 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).

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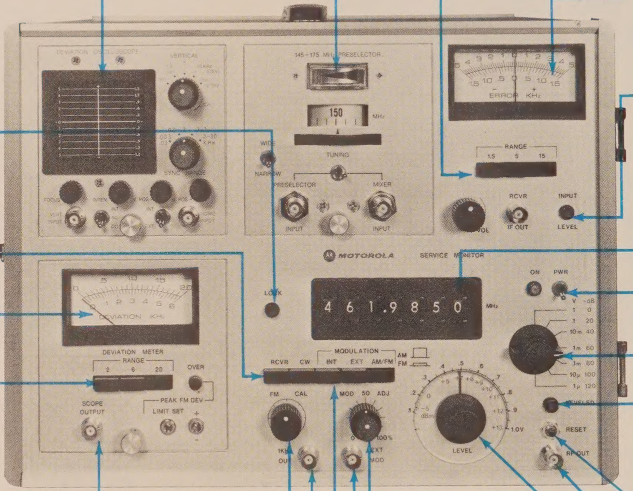
*Compatible with R-1200 only. For replacement plug-in for S-1327 series, contact your Motorola Representative.
**Not recommended for "DPL" use in S-1327 series mainframe. Consult your Motorola Representative for further information.

Human Engineered for Easy Operation


DEVIATION OSCILLOSCOPE
VERTICAL
SYNC RANGE
FOCUS
145 - 175 MHz PRESELECTOR
150
MHz
WIDE
NARROW
TUNING
PRESELECTOR
MIXER
INPUT
INPUT
ERROR KHz
RANGE
1.5
5
15
RCVR
INPUT
VOL
IF OUT
LEVEL
MOTOROLA
SERVICE MONITOR
ON
PWR
LOCK
4 6 1.9 8 5 0
MHz
DEVIATION KHz
DEVIATION METER
RANGE
2
6
20
OVER
SCOPE OUTPUT
PEAK FM DEV
LIMIT SET
MODULATION
RCVR
CW
INT
EXT
AM/FM
AM
FM
FM
CAL
MOD
50
ADJ
1KHz OUT
EXT MOD
LEVEL
LEVELED
RESET
RF OUT

MULTIPURPOSE OSCILLOSCOPE—For visual display of deviation measurements. • High sensitivity (lmv/div) allows scope to be used for other servicing procedures. • AC or DC coupling switch selectable. • Calibrated attenuator.

"OFF-THE-AIR" PRESELECTOR OR BROADBAND MIXER — "Off-the-air" unit shown also incorporates broadband mixer (at no extra cost) eliminating the need to interchange plug-ins when switching from "off-the-air" measurements to general servicing.

PUSH-BUTTON RANGE SWITCH—Provides frequency readout resolution in 3 steps (1.5/5/15 kHz) on zero center frequency meter.

ILLUMINATED — Zero center carrier frequency meter.

INDICATOR LIGHT—Illuminates when synthesizer is in locked "drift-free" mode.

RECEIVE AND CW PUSH-BUTTON SELECTOR SWITCHES — Drift-free locked mode.

ILLUMINATED DEVIATION METER PLUG-IN—Can be removed completely and alternately interchanged with scope plug-in (optional).

PUSH-BUTTON RANGE SWITCHES — Select meter scale range.

SCOPE OUTPUT—for observing instantaneous peak deviation using any standard shop scope. **Over-deviation light** indicator illuminates when preset peak deviation level is exceeded. **Limit control** used to preset limit for over-deviation light ± **switch** is used to observe either side to check for unbalanced or asymmetrical deviation.

INPUT LEVEL LIGHT—Indicates adequate receiver input level. **Audio level control** — adjusts receiver volume. **BNC connector** provides an i-f signal to permit extra high resolution, counter readout of the actual receiver i-f.

DIGITAL DISPLAY — Frequency (7 digits) is set up easily with thumbwheel type selection, with resolution to 100 Hz!

POWER "ON" LIGHT INDICATOR AND ON/OFF SWITCH.

STEP ATTENUATOR—Range selector, 7 ranges, 120 db.

LEVELED INDICATOR—Illuminated LED indicates stable RF output and that overload protect circuit is in reset mode. LED extinguishes with unstable output or when overload protect circuit is tripped.

RESET—For restoring electronic overload protection and r-f output.

RF OUTPUT. 50Ω.

ADJUSTABLE ATTENUATION — of the signal generator output.

FM CALIBRATED CONTROL — For adjusting frequency of the signal generator when in an FM mode.

CONCENTRIC DEVIATION ADJUST KNOBS — For controlling internal and external modulation simultaneously for AM and FM.

BNC OUTPUT JACK—Provides 1000 Hz audio tone for modulating FM two-way radio transmitter or for general audio use.

BNC INPUT JACK—For external audio or pulse code modulation.

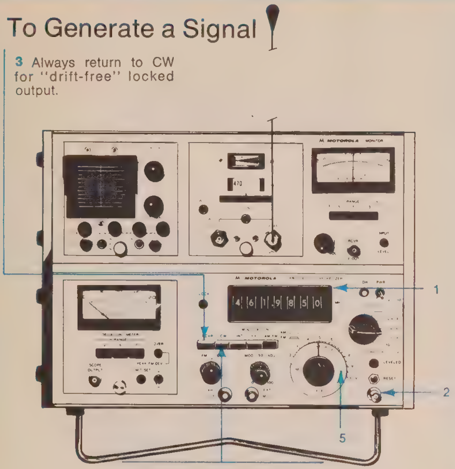
PUSH-BUTTON SELECTION—Of internal and/or external modulation.

Condensed Operating Instructions

SEE MANUAL FOR DETAILED OPERATING PROCEDURES

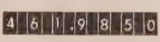
To Generate a Signal

3 Always return to CW for "drift-free" locked output.



4 Unlocked (AFC circuit), adjustable with FM cal control. Use only when modulated output is required.

1 Dial up desired frequency.

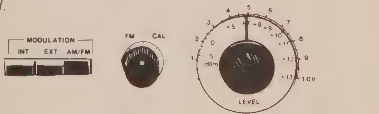


2 Interconnect coax cable from receiver to the RF output BNC connector.

3 Press CW button to generate unmodulated r-f signal for checking receiver sensitivity and quieting. *In this mode the frequency of the output signal is "locked" to the master oscillator and is "drift-free."* Use this mode for most of your signal needs.

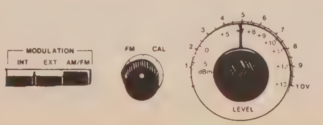
4 For FM modulated signals, required for checking tone or "private lines" systems, depress either internal or external FM buttons (or both for simultaneous internal and external modulation) place the AM/FM switch in FM position and adjust black knob for internal 1000 Hz tone and/or red knob for external deviation input. Adjust frequency of signal generator to zero (or any desired frequency off set) using FM CAL tuning knob.

Always return to "locked" CW mode when modulation is not required.



5 For AM modulated signals, depress either internal or external modulation button (or both for simultaneous internal and external modulation), place the AM/FM switch in AM position and adjust black knob for internal 1000 Hz tone, 0 to 90% modulation and/or red knob for external 0 to 90% modulation. Adjust frequency of signal generator to zero (or any desired frequency off set) using FM CAL tuning knob.

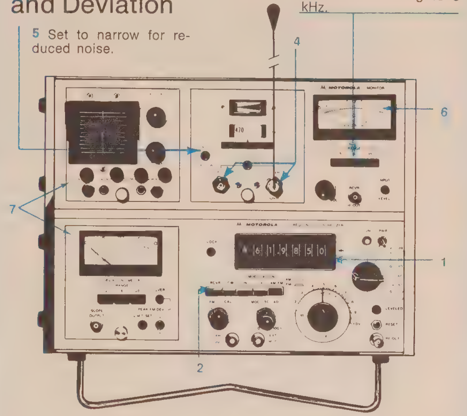
Always return to "locked" CW mode when modulation is not required.



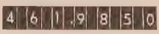
To Measure Frequency and Deviation

3 Normal setting is 5 kHz.

5 Set to narrow for reduced noise.



1 Dial up known carrier frequency.



2 Press receive button.

3 Press 1.5, 5, or 15 kHz pushbutton to select desired range.

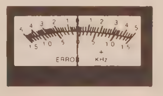
RANGE
1.5
5
15

4 Connect antenna or pick-up lead to broadband mixer or pre-selector BNC input and place selector switch in proper position to coincide with BNC connector.

PRESELECTOR
INPUT
MIXER
INPUT

5 Place wide/narrow selector switch in "wide". If interference is experienced, use "narrow".

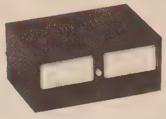
6 Read frequency error on meter.



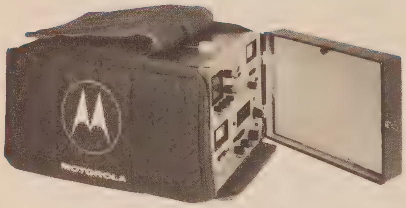
7 Set meter or scope range control to desired setting and read deviation from meter or scope. Audio quality can be monitored on speaker.

15KHz
(DEV)
10
V/DIV
CAL

Service Monitor Accessories


A

C


B

D

Remote Meters

A Observe deviation and frequency and monitor audio quality from another bench, a service drive, outside the shop, or other working area with the SLN-6379A Remote Meter Unit. No need to tie up two men, with one making adjustments while the other watches the meters. Unit consists of a deviation meter, a zero-center frequency meter, a speaker, rear panel volume control, and two indicator lights for power "on" and "receiver squelch." Remote Meter Unit does not interfere with instrument meters, i.e. both sets of meters operate simultaneously . . . no switching from one set of meters to the other is required. Supplied with a standard 6-prong, male Jones type receptacle, you can make your own cable up to 225 feet or order optional assembled cable below. Service Monitor end of cable requires a 6-prong male Jones plug. Each SKN-6025A cable consists of 75 feet of cable plus male and female connectors. Cables can be connected in series when longer runs are required.

Note: Service monitor must include Deviation Meter Plug-In RTC-4000A for proper operation of Remote Meters.

SLN-6379A	Remote Meters for S-1327. Est. shpg. wt. 2½ lbs. (1130g). Est. packaged dim. 11½ x 9 x 6¼ in. (292 x 229 x 156 mm).
SKN-6025A	Cable Assembly, 75 feet. Est. shpg. wt. 4½ lbs. (2030g). Est. packaged dim. 8¼ x 4½ x 13¾ in. (210 x 114 x 349 mm).
9-84885	Connector only, female 6-pin Jones. Est. shpg. wt. 1 oz. (28g).
28-898285	Connector only, male 6-pin Jones. Est. shpg. wt. 1 oz. (28g).
30-84155C01	Cable only, 5-cond. shielded. Est. shpg. wt. per ft. 1 oz. (28g).

Rugged Protective Cover for Service Monitor

B Rugged canvas #8 duck with one-half inch polyurethane padding and two heavy duty brass zippers, double stitched throughout and lined with 1038 army duck fabric protects your Service Monitor. Cover reduces moisture penetration and padding also serves as insulation to reduce oscillator temperature extremes when moving the unit. Service Monitor must be removed from cover before operating, to allow adequate ventilation.

RTL-4010A	Protective Cover for R-1200.
TEKA-88	Protective Cover for S-1327.

Cigarette Lighter Connector

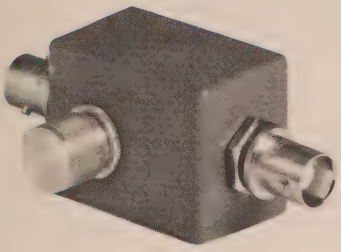
C The ultimate in convenience. Use this handy connector to plug your dc powered (inverter equipped) instruments into your vehicle cigarette lighter. For negative ground systems only.

28-82620C01	Convenient cigarette lighter connector (cable not supplied) for operating inverter from vehicle battery. Connector rated at 10 amps.

Shipping/Carrying Case

D Deluxe shipping/carrying case protects Service Monitor in transit. Rugged fiberglass with foam padding. Simply lift cover from unit and it's ready to use.

SLN-6368A	Deluxe Shipping/Carrying Case. Est. shpg. wt. 24 lbs. (11 kg). Est. packaged dim. 25 x 22 x 19 in. (635 x 559 x 483 mm).


A

B

20 dB Attenuator Pad and Cable for S-1327 Series

A The SLN-1011A Attenuator Pad and Cable provides an additional 20 dB attenuation at the Service Monitor RF output. A conventional built-in fuse holder elminates the need to remove Service Monitor panels to gain access to the fuse. Can be used with either "B" suffix version or earlier "A" suffix version Service Monitors.

SLN-1011A 20 dB Attenuator Pad and Cable.

Instrument Cart

B Features a slanted top to support the instrument at a convenient viewing angle, easy rolling 3″ rubber tread swivel casters, exclusive back support arm, tubular steel (1″ dia.) electrically welded construction, bright hot-dip galvanized finish, and phenolic plastic coated ⅝″ plywood top and shelf. Dimensions: 17″ x 19″ top, 34″ high overall.

ST-1152 Instrument Cart.

12V dc To 117V ac Inverter for S-1327 Series

Take your Service Monitor anywhere or "warm" it up on the way using your 12V dc vehicle battery. The compact SLN-6364A DC or AC Inverter is mounted on the rear panel of the S-1327 Service Monitor and connected to a special transformer winding already incorporated in the unit. For negative ground systems only.

SLN-6364A DC to AC Inverter. Est. shpg. wt. 9 oz. (252g). Est. packaged dim. 6 x 4¼ x 3¼ in. (152 x 108 x 83 mm).

How to Select an Oscillator

The heart of any frequency generating or monitoring instrument is the crystal oscillator used to produce the basic master frequency reference. This reference time base is then either divided down or multiplied up (or both) and any instability or frequency errors will affect the ultimate accuracy of the instrument. It is therefore very important to make the choice of oscillator fit the end use intended for the type of equipment purchased.

Types of Oscillators

"Free-Air" Crystal Oscillators

This type of oscillator has the lowest performance stability and is used in test equipment that operates in non-critical low RF and audio frequency ranges. No attempt is made to isolate the crystal from environmental temperature variations as is the case with oven types or the TCXO units. Therefore, the warm-up characteristics and stability with temperature provides a low performance oscillator.

TCXO

If the instrument will be used in a service shop or laboratory, the TCXO will provide excellent performance as it exhibits low aging and rapid warm-up ("instant on") in this kind of environment. It is not recommended for field service where a wide range of ambient or storage temperatures will be encountered.

Standard (Octal Base) Service Monitor Time Base

This unit has good aging and warm-up characteristics and employs a proportional type oven for temperature control. After 45 days of initial operation, its aging rate is ±3 parts x 10^{-9} per day or less. It is an excellent choice for all around field use and only exceeded by the high stability casting type units.

High Stability (Casting Type)

This oscillator design represents the ultimate in high accuracy, warm-up, and stability in changing temperature environments. This type of unit is typically used only in high-grade deluxe lab equipment, frequency standards, and military equipment. It's main advantages are faster warm-up, lowest aging rate, and best temperature drift spec of all the oscillator types. Since it has an excellent retrace spec, it is ideal where equipment is turned "on" and "off" a number of times each day as is the case in field use.

Oscillator Characteristics

Aging Rate

The aging rate specification probably has the greatest effect on the cost of the oscillator selected. The aging rate or drift with time is not a linear process but is exponential and typically becomes less and less each day (if left "on"). This fact should be kept in mind when extrapolating and extending the period of time in days, weeks, etc. for any oscillator. For example, simply taking 1 x 10^{-9} aging rate per day and multiplying by 365 days would produce 365 x 10^{-9} or 3.65 x 10^{-7} apparent aging error when in fact the total might be one fourth or half this amount.

Note that heat tends to accelerate the aging rate of a crystal. Thus, while the oven type oscillator will exhibit better temperature stability than the unheated TCXO, the TCXO will exhibit better long term aging than the oven type oscillator.

TCXO—The exponential aging rate is graphically exhibited with the TCXO aging rate total of less than ±1 x 10^{-6} for a year's time. Much of the aging with this unit occurs in the first 3 to 4 months where it has aged to typically 5 x 10^{-7} (total aging).

Standard (Octal Base) Service Monitor Time Base—Another example is the standard Service Monitor Oscillator. It is rated at ± 7 x 10^{-9} per day initially but is only ±3 x 10^{-9} after 45 days of operation comparing very favorably with our better high stability types.

High Stability—The high stability types are guaranteed to exhibit 3 x 10^{-9} (or better) aging when shipped. Field experience and accumulated data has shown that these oscillators will exceed these already low aging rates substantially. Again, a straight extrapolation of these specs versus time produces a very conservative figure.

Temperature Stability

(Frequency error related to ambient temperature change.)

TCXO Type Oscillator — (Fundamental Frequency of 4 MHz) 0 to + 55°c range ±0.0001% referenced to 25°c (room temperature) Note: Not linear per degree centigrade. Therefore, the above spec shows the maximum error possible in the 0 to +55° centigrade range referenced to 25°c (room temperature).

Standard (Octal Base) Service Monitor Time Base—(Fundamental Frequency of 1 MHz) −10 to +55°c range ±3 x 10^{-9} per degree of ambient change. Therefore, from a 25°c reference, the effect of temperature could be: 25 degrees x 3 x 10^{-9} = 75 x 10^{-9} or 7.5 x 10^{-8} or 0.0000075%. However, over a narrow range of +20°c (68°F) to +30°c (86°F) (±5°c of the room temperature reference of +25°c) the total possible error is only ±1 x 10^{-7} which is more than adequate for two-way radio servicing.

High Stability (X Suffix)—(Fundamental Frequency of 3 MHz) −15 to +60°c range Only ±2 x 10^{-10} per degree of ambient change. Using the preceding example: 25 degrees x 2 x 10^{-10} = 50 x 10^{-10} or 5 x 10^{-9} or 0.0000005%.

Conversion chart showing possible temperature variation from 25°c reference of 3 oscillator types from 0° −50°.

	Percent	PPM	Parts x 10^{-N}
TCXO	±0.0001%	±1	±1 x 10^{-6}
Octal Base Standard	±0.0000075%	±.075	±7.5 x 10^{-8}
Hi Stab	±0.0000003%	±.003	±3 x 10^{-9}

Summary

As indicated above, the oven type oscillators exhibit excellent stability with temperature variations in comparison to the TCXO temperature compensated types. However, the TCXO since it is unheated has excellent low aging rates. The following chart shows the relationship between percent, parts per million, and parts x 10^{-N}.

This chart illustrates the relationship of parts x 10^{-N}, percent, parts per million (PPM) and their effect when this error is multiplied up to 1000 MHz.

Parts x 10^{-N}	Percent	PPM	Error at 1 MHz	Multiplied Error at 1,000 MHz
1 x 10^{-5}	0.001	10.0	10 Hz	10,000 Hz
1 x 10^{-6}	0.0001	1.0	1 Hz	1000 Hz
1 x 10^{-7}	0.00001	0.1	0.1 Hz	100 Hz
1 x 10^{-8}	0.000001	0.01	0.01 Hz	10 Hz
1 x 10^{-9}	0.0000001	0.001	0.001 Hz	1 Hz

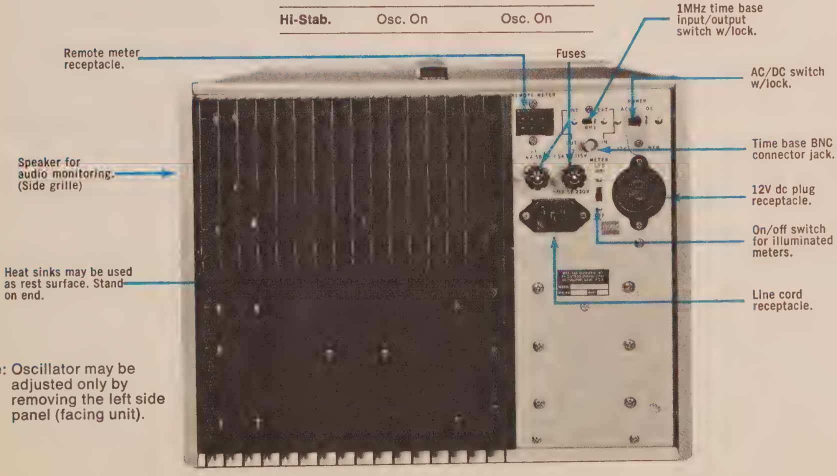
Oscillator Comparison Chart

	Warm-up	Performance Drift w/Temp. Change of Ambient	Performance w/Extremes of Storage	Long Term Aging Rate	Long Term Aging Calculations	Comments
TCXO "T" Suffix Option	None Required (no oven) Good at room temp. poor at low & high temp.	Poor. Recommended for service shop only. Not for all around use.	Poor. Would take excessively long to warm up from low temp. storage	Excellent	Accumulates to $\pm 1 \times 10^{-6}$ per year on an exponential curve.	1) Low power consumption 2) Excellent aging, long term 3) Good retrace characteristics 4) Poor with temp. variations as the oscillator must reach the thermal stability of the unit.
Octal Base (This is the standard service monitor oscillator)	Good Warm-up from extremes (approx. 30 min.)	Shop or field use. $\pm 3 \times 10^{-9}$ per degree	Good to excellent	Good to excellent	Specification: $\pm 7 \times 10^{-9}$ x first 45 days $\pm 3 \times 10^{-9}$ balance of year $\pm 7 \times 10^{-9} \times 45 = 315 \times 10^{-9}$ $\pm 3 \times 10^{-9} \times 320 = 960 \times 10^{-9}$ $1275 \times 10^{-9} = 1.27 \times 10^{-6}$ total, worst case	1) Aging good to excellent 2) Can be used over −10°c to +55°c, can be stored 55°c to +100°c 3) Good warmup—30 minutes or less.
High Stability ("X" suffix option)	faster warm-up than STD (approx. 15 min.)	Field or shop plus lab performance $\pm 2 \times 10^{-10}$ per degree	Excellent, fastest warm-up of all types	Excellent approaching state of the art	$\pm 3 \times 10^{-9}$ per day x $365 = 1095$ per day x 10^{-9} or 1.1×10^{-6} per year, worst case	1) Aging excellent 2) Can be used over −15°c to 60°c 3) Fast warm-up, 10 to 15 min. depending on frequency band. 4) Excellent retrace after unit is shut down and restarted. 5) Excellent temperature drift spec. Highest cost unit but best overall performance & specs of any unit on the market.

An important feature of the service monitor is that as long as the R-1200 is plugged into a live AC outlet and even though the unit is turned "off," the oscillator is being powered. This is most important as it results in a stable, accurate and low aging characteristic. Refer to table below.

With Power Switch "Off"

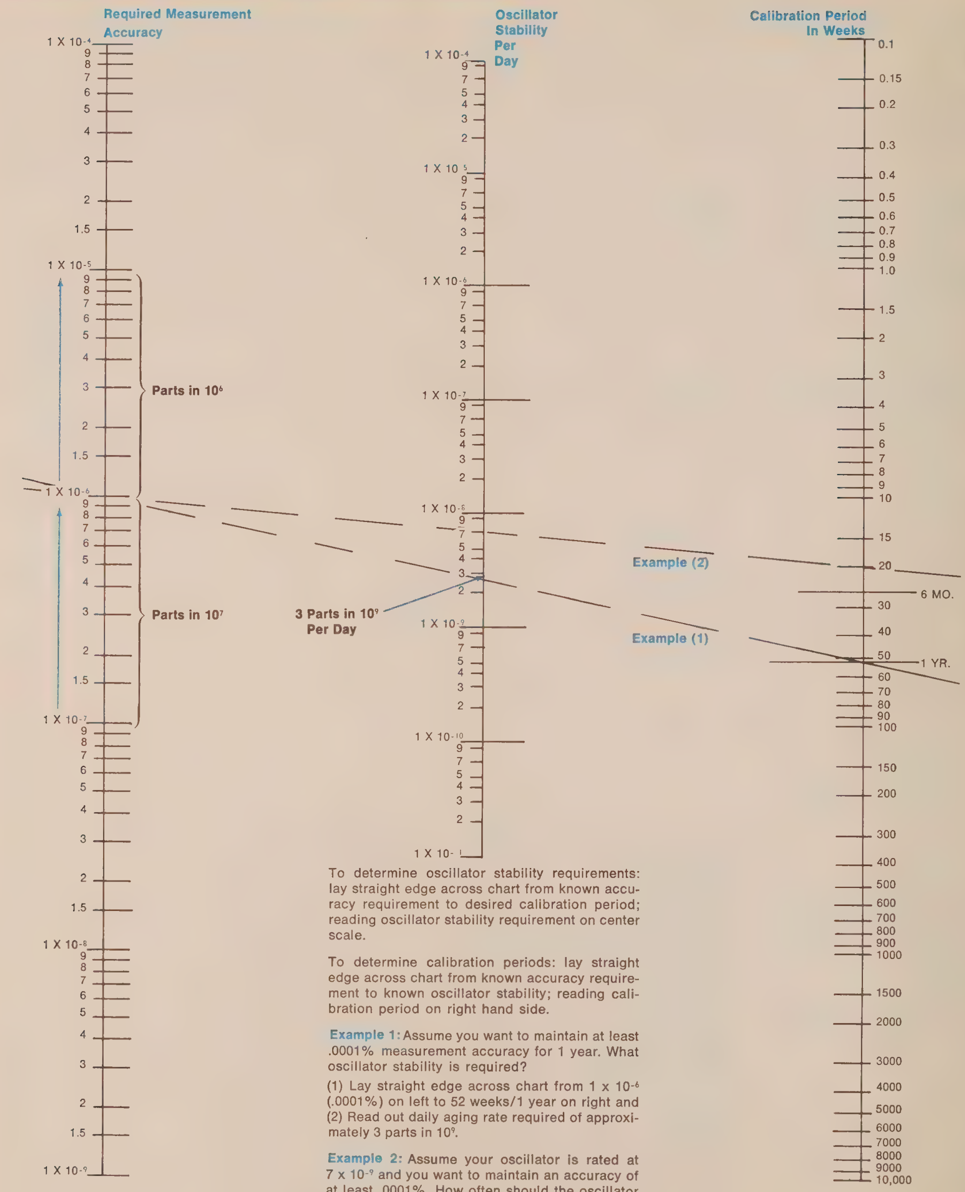
	115V AC Line	230V AC Line
TCXO	Osc. Off	Osc. Off
Std. Osc.	Osc. On	Not Recommended
Hi-Stab.	Osc. On	Osc. On


1MHz time base input/output switch w/lock.
Remote meter receptacle.
Fuses
AC/DC switch w/lock.
Time base BNC connector jack.
Speaker for audio monitoring. (Side grille)
12V dc plug receptacle.
On/off switch for illuminated meters.
Heat sinks may be used as rest surface. Stand on end.
Line cord receptacle.

Note: Oscillator may be adjusted only by removing the left side panel (facing unit).

Service Monitor Rear View

Oscillator Stability/Calibration



To determine oscillator stability requirements: lay straight edge across chart from known accuracy requirement to desired calibration period; reading oscillator stability requirement on center scale.

To determine calibration periods: lay straight edge across chart from known accuracy requirement to known oscillator stability; reading calibration period on right hand side.

Example 1: Assume you want to maintain at least .0001% measurement accuracy for 1 year. What oscillator stability is required?

(1) Lay straight edge across chart from 1 x 10^{-6} (.0001%) on left to 52 weeks/1 year on right and (2) Read out daily aging rate required of approximately 3 parts in 10^9.

Example 2: Assume your oscillator is rated at 7 x 10^{-9} and you want to maintain an accuracy of at least .0001%. How often should the oscillator be recalibrated?

(1) Lay straight edge across chart from 1 x 10^{-6} (.0001%) on left to 7 x 10^{-9} in center and (2) read out calibration period of approximately 20 weeks at right.

Service Monitor Plug-Ins

SPECIFICATIONS

Operating Modes: FM/AM/SSB Monitor, Signal Generator—AM, FM, CW.

SIGNAL GENERATOR MODE

Frequency:

Range: 100 Hz to 999.9999 MHz. **Display:** 7 digits individually selectable. **Resolution:** 100 Hz. **Accuracy:** Refer to accuracy of master oscillator .

Output (Levelled into 50 ohms):
Range: 0.1 μV to 1 VRMS −127 dBm to +13 dBm.

Flatness:*

(@ .5 μv and 25°C)	Typical	Maximum
100 kHz—250 MHz	±1 dB	±1 dB
250 MHz—550 MHz	±1 dB	±1½ dB
550 MHz—1000 MHz	±1½ dB	±2 dB

Accuracy**

100 Hz—500 MHz:
0 dB, Uncalibrated
Steps 20, 40, 60, 80 dB, ±1 dB
100, 120 dB, ±1½ dB

500 MHz—1000 MHz:
0 dB, Uncalibrated
Steps 20, 40, 60, 80 dB, ±1½ dB
100, 120 dB, ±2 dB

Temperature Variance: ±.5 dB additional over 0°C-55°C

Spectral Purity:

Harmonics: ≦−25 dBc. **Non-Harmonic Spurious: 100 kHz—110 MHz:** ≦−40 dBc. **110 MHz—1000 MHz:** ≦−50 dBc. **Noise: Residual FM: (.1 to 3 kHz BW): 100 kHz—500 MHz:** ≦50 Hz RMS. **500 MHz—1000 MHz:** ≦100 Hz RMS. **Residual AM: (.1 to 3 kHz BW):** ≦.1% at +13 dBm. **1Hz BW noise at 50 kHz offset: 100 kHz—500 MHz:** ≦−103 dBc. **500 MHz—1000 MHz:** ≦−97 dBc. **Attenuator:** 20 dBm Variable, 20 dBm steps over 6 ranges. **Impedance:** 50 ohms. **Connector:** BNC. **Output Modes:** AM, FM, CW.

Amplitude Modulation:

Range: 0 to 90% at output setting of +7 dB on vernier attenuator. **Rate:** dc to 10 kHz. **Internal Rate:** 1 kHz fixed. **Pulse Response:** ≦40 μs rise and fall. **Dial Accuracy:** ±20% of reading, 5% absolute. **External Input:** Approximately 1 VRMS for 100%, BNC Connector. **Distortion (@ 1 kHz rate): at 30% modulation:** .6% typical, 1.2% maximum. **at 70% modulation:** .5% typical, 2.5% maximum. **at 90% modulation:** 1% typical, 5% maximum. **Impedance:** 600 ohms. **Incidental FM at 30% AM, 1 kHz rate:** ≦90 Hz. **Modes:** Internal, external or both simultaneously.

Frequency Modulation:

Internal Rate: 1 kHz fixed. **Deviation:** 0 to 20 kHz peak. **Rate:** dc to 15 kHz. **Pulse Response:** ≦40 μs rise and fall. **External Input:** Approximately 1.5 volt peak for 20 kHz peak deviation, BNC connector. **Impedance:** 600 ohms. **Distortion: at 20 kHz Deviation, 1 kHz rate:** ≦1.2%. **at 20 kHz Deviation, 15 kHz rate:** ≦2.6%. **at 10 kHz Deviation, 15 kHz rate:** ≦1%. **Incidental AM at 20 kHz Deviation, 1 kHz rate:** ≦−.1%. **Modes:** Internal, external or both simultaneously.

MONITOR MODE:

Frequency Range: 20 MHz to 990 MHz, depending on preselector or mixer selected. **Display:** 7 digits individually selectable. **Resolution:** 100 Hz. **Accuracy:** Equal to accuracy of master oscillator. **Frequency Error Meter:** 3 ranges ±1.5 kHz, 100 Hz resolution; ±5 kHz, 200 Hz resolution; ±15 kHz, 1 kHz resolution. **Input Sensitivity:** Function of preselector or mixer selected, 20 μV to 10 mV range. **Receiver IF Out:** 10 MHz, BNC connector. **Squelch Threshold:** Approximately 1 mV with Broad Band Mixer. **Audio Monitor Amplitude:** >6 V P-P into 8 ohms (>5 watts). **Distortion:** ≦3% at .5 watt.

GENERAL:

Time Base: Refer to specification of master oscillator. **Warm Up:** Refer to specification of master oscillator. **Internal 1 kHz Output Level:** 0 to 1 VRMS. **Distortion:** ≦1%. **Connector:** BNC. **Output Protector Trip:** Approximately 10V peak ±dc and ac to 1000 MHz. **Reset:** Push-button. **Indicator:** Levelled LED. **RF Leakage:** At level not to increase IF output test point of a A04FNC pager (.2 μV sensitivity) by more than ½ dB between CW and RCVR operating modes and placed 12 inches (30.5 cm) in front of unit developing .5 μV output into a shielded termination. **Power Required: ac:** 100-130V ac, 200-260V ac RMS, 50-60 Hz 90W max., plug programmable, color coded. **or dc:** 13.6 dc built in inverter, 90W max. **Indicators:** On—Power Lock—Frequency Leveled—RF Output/Overload. Input Level—Receiver. **Temperature:** Storage: −15°C to +85°C (5°F to 185°F). Operating: 0°C to 55°C (32°F to 131°F). **Weight:** 45 lbs. (20.4 kg) (less plug-ins). **Size:** 14 in. wide (35.6 cm) 19⅜ deep (with cover) (49.2 cm) 10¾ in. high (27.3 cm).

PLUG-INS

Standard Broadband FM Mixer:

Range: 20 MHz to 90 MHz. **Sensitivity:** 1mV for receiver "turn-on" at 512 MHz. **Connector:** BNC.

High Gain Broadband FM Mixer:

Range: 20 MHz to 990 MHz. **Sensitivity:** 20 microvolts, nominal, for receiver "turn-on" to 512 MHz. **Connector:** BNC.

FM Pre-selectors:

Range: In pre-selector mode; 25-50 MHz, 145-175 MHz, 406-420 MHz, or 450-512 MHz depending on model selected. **In broadband mode:** 20 MHz to 990 MHz. **Sensitivity:** 20 microvolts, nominal, for receiver "turn-on" in pre-selector mode. 10 mV nominal for receiver "turn-on" in broadband mode. **Connectors:** BNC.

AM/FM/SSB Receiver Module:

Range: 100 kHz to 999.99 MHz. **Input Signal:** CW, AM, FM, or SSB. **Sensitivity:** 100 kHz to 8.9 MHz < 50 μV; 11.1 MHz to 15 MHz < 50 μV; 15 MHz to 500 MHz < 25 μV; 500 to 999.99 MHz < 50 μV; typical levels for meaningful measurements. **Max. RF Input:** 0.5V rms operating. 10V rms without damage. **Input Connector:** BNC. **Selectivity:** (3 db BW 100 μV rms input). AM, ±10 kHz nom. Narrow FM, ±8 kHz nom. Wide FM ±150 kHz nom. **AM Modulation Meter:** 0-30% range, 0-100% range with ± peak selector switch. **Meter Accuracy:** ±8% of reading up to 95% symmetrical modulation. **Demodulated Output:** AM, 10 mv p-p per 1%. SSB, 1V p-p typical. FM, 0.5V p-p typical at 3 kHz deviation. **Output Distortion:** less than 5% at 80% AM, 1 kHz mod. freq. **Output Frequency Response:** 100 Hz to 5 kHz. **Output Impedance:** 10k ohm nom. **Frequency Error Indicator, FM Dev. Meter, and Audio Speaker:** on mainframe: **Power:** supplied by mainframe.

Note: Compatible with mainframe serial numbers 14001-7 and up without modification.

Deviation Meter:

Range: 0-2, 6, 20 kHz. **Accuracy:** ±4% of full scale. **Indicators:** Meter (analog). Peak deviation light with preset control. **Frequency Response:** dc —20 kHz. **Connector:** Scope output BNC Jack.

Oscilloscope:

Range: 1.5, 5, 15 kHz deviation; 0.01, 0.1, 1, 10, 100 volts/division. **Frequency Response:** 50 kHz. **Inputs:** Internal/external vertical and horizontal, each with separate switches for selection of internal or external input and sync. **Sync. Range:** 3 Hz to 30 kHz. **Accuracy:** ±5%. **Sensitivity:** 1 millivolt/division.

Audio Frequency Synthesizer:

Frequency and Resolution: Three Ranges, 10.00 to 99.99 Hz (0.01 Hz resolution). **Accuracy:** Same as reference osillator in main frame. **Output Waveform:** Sinusoidal. **Distortion:** Less than 1.5%. **Output Level:** Variable to 3 Vrms into 600 ohms. **Tone Duration:** Continuous or variable, 0.1 to 1 second burst. **Operating Temperature:** −12° to +55°C.

Specifications subject to change without notice.

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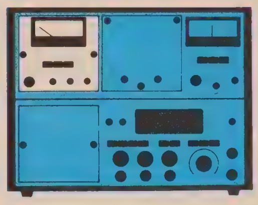
*Variance of output as a function of frequency at fixed output setting

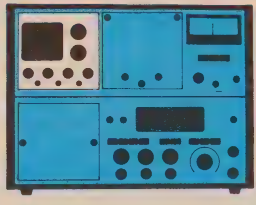
**Additional one-time inaccuracy when switching from range to range

Custom Design an Instrument...



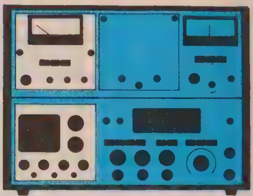
MODEL R-1200AA

Basic Service Monitor with meter type deviation indicator and mixer.



MODEL R-1200AB

Basic Service Monitor with scope type deviation indicator and mixer.

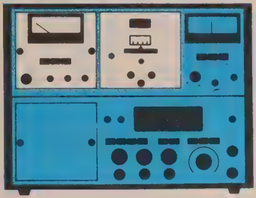


MODEL R-1200AC

Basic Service Monitor with both meter and scope type deviation indicators and mixer.

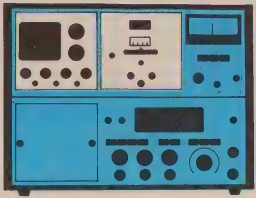
R-1200A	Service monitor, basic unit less plug-ins, supplied complete with front cover, antenna, ac line cord, dc connector, card extender, card extractor, instruction and service manual and standard master oscillator. Est. shpg, wt. 60 lbs. (24.30 kg.) Est. Packaged dim. 28 x 18 x 20 in. (71.12 x 45.72 x 50.80 cm.)
RTC-4000A	Meter, deviation unit. Est. shpg. wt. 2½ lbs. (1.13 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
RTC-4001A	Scope deviation unit. Est. shpg. wt. 4½ lbs. (2.03 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6352A	Wide-band FM unit. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6396A	High gain broadband FM mixer. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6353A	25-50 MHz FM pre-selector and wide-band input. Est. shpg. wt. 2½ lbs. (1.13 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6354A	145-175 MHz FM pre-selector and wide-band input. Est. shpg. wt. 2½ lbs. (1.13 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6355A	450-512 MHz FM pre-selector and wide-band input. Est. shpg. wt. 2½ lbs. (1.13 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6369A	406-420 MHz FM pre-selector and wide-band input. Est. shpg. wt. 2½ lbs. (1.13 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
RTC-4018A	AM/FM/SSB plug-in Receiver Module. Est. shpg. wt. 5 lbs. (2.27 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 31.75 cm).
SLN-6381A	Audio frequency synthesizer. Est. shpg. wt. 2 lbs. (.9 kg). Est. packaged dim. 5½ x 5½ x 12½ in. (13.97 x 13.97 x 13.75 cm).
SLN-6379A	Remote Meters for S-1327. Est. shpg. wt. 2½ lbs. (1130g). Est. packaged dim. 11½ x 9 x 6¼ in. (292 x 229 x 156 mm). Order cable assembly or cable and connectors separately. **Note:** Service monitor must include Deviation Meter Plug-In RTC-4000A for proper operation of Remote Meters.
SKN-6025A	Cable Assembly for remote meters, 75 feet. Est. shpg. wt. 4½ lbs. (2030g). Est. packaged dim. 8¼ x 4½ x 13¾ in. (210 x 114 x 349 mm).
9-84885	Connector only for remote-meters, female 6-pin Jones. Est. shpg. wt. 1 oz. (28g).
28-898285	Connector only for remote meters, male 6-pin Jones. Est. shpg. wt. 1 oz. 28g).
30-84155C01	Cable only for remote meters, 5-cond. shielded. Est. shpg. wt. per ft. 1 oz. (28g).
1-80306A38	Line Voltage Plug — 115v AC — White
1-80306A33	Line Voltage Plug — 100v AC — Brown
1-80306A34	Line Voltage Plug — 125v AC — Red
1-80306A35	Line Voltage Plug — 200v AC — Orange
1-80306A36	Line Voltage Plug — 230v AC — Yellow
1-80306A37	Line Voltage Plug — 250v AC — Green
28-82620C01	Convenient cigarette lighter connector (cable not supplied) for operating inverter from vehicle battery, negative ground only. Connector rated at 10 amps.
ST-1152	Instrument Cart.
SLN-6368A	Deluxe Shipping/Carrying Case for S-1327. Est. shpg. wt. 24 lbs. (11 kg.) Est. packaged dim. 25 x 22 x 19 in. (635 x 559 x 483 mm.)
RTL-4010A	Canvas Protective Cover for R-1200

to Meet Your Needs



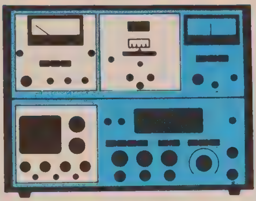
MODEL R-1200AAD

Service Monitor with meter type deviation indicator and VHF pre-selector.



MODEL R-1200ABD

Service Monitor with scope type deviation indicator and VHF pre-selector.



MODEL R-1200ACD

Service Monitor with both meter and scope type deviation indicators and VHF pre-selector.

STANDARD MODELS

The table below lists the most popular basic service monitor/plug-in combinations.

R-1200ACT	R-1200ACX	R-1200ACE	R-1200ACD	R-1200ACB	R-1200ACA	R-1200AC	R-1200ABT	R-1200ABX	R-1200ABE	R-1200ABD	R-1200ABB	R-1200ABA	R-1200AB	R-1200AAT	R-1200AAX	R-1200AAE	R-1200AAD	R-1200AAB	R-1200AAA	R-1200AA	R-1200AT	R-1200AX	R-1200A	Options included:
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	R-1200A BASIC UNIT
●	●	●	●	●	●	●								●	●	●	●	●	●	●				RTC-4000A METER
●	●	●	●	●	●	●	●	●	●	●	●	●	●											RTC-4001A SCOPE
●	●					●	●	●					●	●	●					●				SLN-6352 MIXER
					●							●							●					RTC-4018A RECEIVER MODULE
				●							●							●						SLN-6353A 25-50 MHz
			●							●							●							SLN-6354A 145-175 MHz
		●							●							●								SLN-6355A 450-512 MHz
●							●							●							●			"T" OPTION (TCXO)*
	●							●							●							●		"X" OPTION (High Stability)*

NOTE: Always put option suffix letters in alphabetical order. Example: R-1200ACDX for a Service Monitor with meter and deviation oscilloscope plug-ins, and 145-175 MHz pre-selector and a high stability oscillator ("X").

**Allow 2-3 weeks additional for high stability or TCXO options.*

FM Station Monitor

A general purpose frequency and deviation bench instrument or an "off-the-air" high accuracy monitor.

FEATURES:

- Monitor audio quality, frequency error, and deviation.
- Digital display of frequency error.
- Automatic scanning.
- Up to 32 channels — 31 pre-programmed with one channel reserved for manual programming as required.
- Automatic, electronic tuning.
- Dual band operation.
- All frequencies synthesized from a single master, high stability oscillator . . . no individual channel crystals.

FM Station Monitor

A new concept in two-way radio communications operations and service.

In an operating system—Maintain frequency and deviation in accord with FCC (Federal Communications Commission) rules and regulations and keep your system operating at peak efficiency. Monitor audio quality and critical system parameters, frequency and deviation, of up to 32 channels from a central location. So easy to use even non-technical, clerical personnel can note "off-frequency" or "over-deviation" conditions and advise service personnel to correct.

In the service shop—Provide a unique service to your customers or operating personnel with automatic, continuous "off-the-air" monitoring of up to 32 channels. Frequency drift and degradation of deviation can be observed either continuously or at regularly scheduled intervals to avert "off-frequency" or "over-deviation" conditions. No need to send technicians to remote sites or call mobile units into shop for periodic frequency and deviation checks. Unit may also be installed in a service van or auto for monitoring or checking distant transmitters.

The S-1338 Station Monitor is a unique and advanced design frequency and deviation instrument. It is capable of being programmed to automatically receive up to 32 separate frequencies selected from any two of the three land mobile FM two way radio bands (low-band VHF, high-band VHF, 450 MHz UHF).

Up to 31 channels are pre-programmed by a set of three plug-in PROM (programmed read only memory) modules on a plug-in program board. Modules may be replaced at any time to change or add new frequencies or provide additional channel capability within the two specified bands. In addition, alternate plug-in program boards may be ordered separately to provide an alternate set of channels. Selected frequencies are programmed to seven digit resolution to allow for the newer channel assignments ending in one-half kilohertz such as 470.6125 MHz. The 32nd channel is manually programmed via seven digital thumbwheels on the front panel.

The Station Monitor automatically scans all of the preprogrammed frequencies switching from one preselector to another and tunes to maximum sensitivity.

An internal preset squelch adjustment limits the sensitivity to approximately five microvolts to ensure a reliable frequency and deviation reading. The receiver unsquelched sensitivity, however, is approximately one microvolt to receive and monitor weak or marginal signals.

A scope indication of system deviation is provided along with four controls for focus, intensity, vertical position, and sweep speed. The scope is automatically blanked when no carrier is present to prevent trace "burn in."

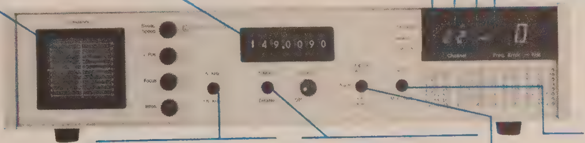
Seven digital thumbwheels allow the 32nd channel to be manually programmed.

"Off frequency light" illuminates when frequency error exceeds ±500 Hz, low band; ±700 Hz high band, or ±1000 Hz UHF to indicate that error is approaching allowable FCC tolerance. Factory set.

Invalid light illuminates when frequency is scanned without appropriate pre-selector.

"Over deviation light" illuminates when deviating over 5 kHz. Factory set.

A **digital readout** provides a continuous indication of the channel being monitored or scanned and the frequency error of the channel is displayed to a resolution of 100 Hz. A polarity indicator shows whether the error is high (+) or low (—). For example, an "off frequency" condition of one and a half kHz low would show as: —1.5 kHz.



A **deviation range switch** of 1.5 and 5 kHz is used to select either tone or normal voice deviation ranges.

A **squelch disable switch** is provided to open the preset (adjustable internally) squelch threshold.

An **alarm switch** is provided to stop scanning should a channel exceed the internally preset frequency and deviation limits. Indicator lights illuminate to show either or both conditions.

An **auto/hold/manual** switch is provided on the front panel for auto scan, channel hold, or manual/advance. As the momentary switch is pulsed, the channel is easily and quickly advanced to pick out any channel for continuous monitoring. On automatic the rate of scan is approximately two seconds and momentary hold of a received channel is internally adjustable from approximately 5 to 10 seconds.

Rear Panel

Each instrument is supplied with a **built-in 12 VDC inverter** for vehicle operation.
A **tape recorder jack** and level control is supplied.
A **discriminator output jack** is provided for remote use or other test purposes.
A **remote speaker jack** is provided along with an internal/external speaker switch.
Dual **external antenna** inputs are provided.

The instrument is supplied with a high quality oscillator which can be used externally via a BNC connector. If a house frequency standard is available the built-in oscillator can be switched off and the external standard can control the frequency monitor. Optional TCXO's and high stability oscillators are also available.

ORDERING INFORMATION

The S-1338A series Station Monitor is available in a wide variety of preselector and oscillator configurations. For your convenience standard models are listed in the charts at right.

When ordering, specify number of programmed channels desired (up to 31 on one program board) and the frequency of each. Frequencies must be limited to two bands corresponding to the frequency ranges of the preselectors in the unit ordered.

Program boards and preselectors may be ordered separately. Alternate program boards programmed with different series of frequencies can be used to provide additional channel capability.

Alarm Relay Option

The optional alarm relay plugs into station monitor to provide a contact closure for an audible or remote signal of an "off frequency" indication.

SLN-6423A Alarm Relay

Standard Station Monitor Models with TCXO

BASIC MAIN FRAME WITH TCXO	SLN-6394A PROGRAM BOARD	SLN-6390A PRESELECTOR LOW BAND	SLN-6391A PRESELECTOR HIGH BAND	SLN-6392A UHF-PRESELECTOR	
●					S-1338AA
●	●	●			S-1338AAB
●	●		●		S-1338AAD
●	●			●	S-1338AAE
●	●	●	●		S-1338AABD
●	●	●		●	S-1338AABE
●	●		●	●	S-1338AADE

Standard Station Monitor Models with Standard Oscillator

BASIC MAIN FRAME WITH STANDARD OSC.	SLN-6394A PROGRAM BOARD	SLN-6390A PRESELECTOR LOW BAND	SLN-6391A PRESELECTOR HIGH BAND	SLN-6392A UHF-PRESELECTOR	
●					S-1338AB
●	●	●			S-1338ABB
●	●		●		S-1338ABD
●	●			●	S-1338ABE
●	●	●	●		S-1338ABBD
●	●	●		●	S-1338ABBE
●	●		●	●	S-1338ABDE

Standard Station Monitor Models with High Stability Oscillator

BASIC MAIN FRAME WITH HIGH STABILITY OSC.	SLN-6394A PROGRAM BOARD	SLN-6390A PRESELECTOR LOW BAND	SLN-6391A PRESELECTOR HIGH BAND	SLN-6392A UHF-PRESELECTOR	
●					S-1338AC
●	●	●			S-1338ACB
●	●		●		S-1338ACD
●	●			●	S-1338ACE
●	●	●	●		S-1338ACBD
●	●	●		●	S-1338ACBE
●	●		●	●	S-1338ACDE

SPECIFICATIONS

Frequency coverage: (any two bands) 29-50 MHz, 145-175 MHz, 450-512 MHz. **Signal required to provide accurate readings:** Less than 5μV. **Signal required to permit audio monitoring (squelch off):** Approximately 1 μV. **Frequency error readout range:** Approximately ±10kHz.

Frequency error readout resolution: 100 Hz. **Frequency error readout accuracy:** ± Oscillator Accuracy + 1 Count. **Stability:** $\pm 7 \times 10^{-7}$ (Referred to input freq.). **Deviation Oscilloscope Ranges:** ±1.5 and ±5 kHz, factory pre-set over-deviation light. **Deviation Oscilloscope Accuracy:** ±5% of full scale. **Total number of channels:** 32. **Number of preset channels:** 31 (alternate sets of pre-programmed channels can be provided via alternate program boards). **Number of switch selectable channels:** 1.

Standard oscillator:

Warmup time: Approximately 15 minutes, **Aging rate:** 1×10^7 parts/week.

High stability oscillator:

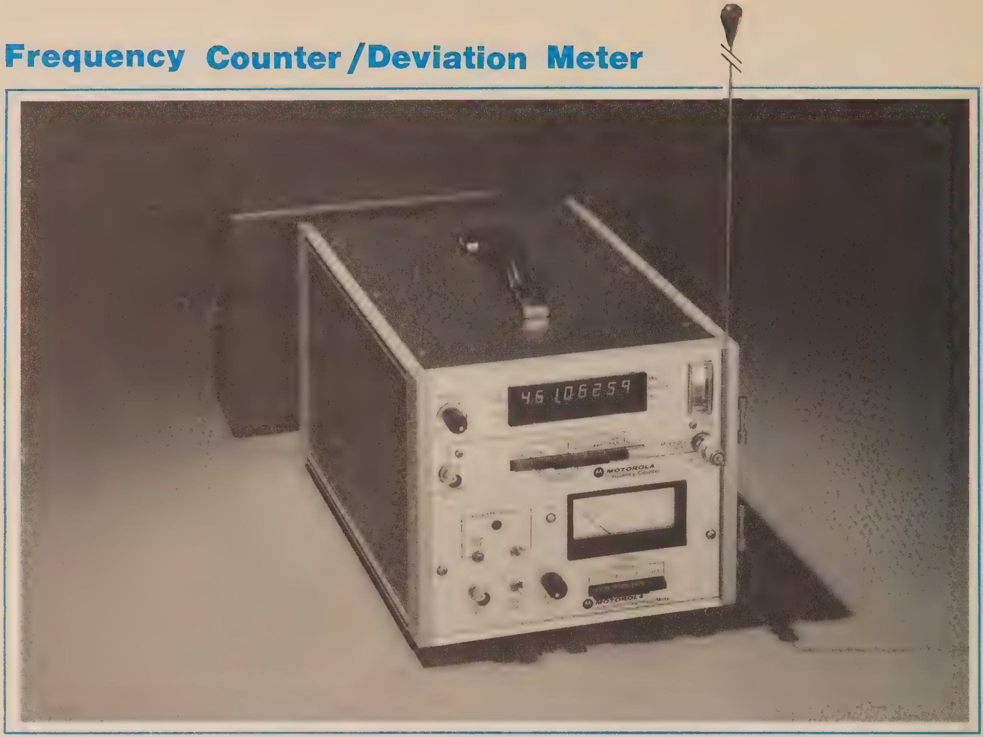
Warmup time: Approximately 15 minutes. **Aging rate:** 3×10^9 parts/day.

TCXO:

Warmup time: None. **Aging rate:** 5 parts in 10^7, **Temperature variation:** ±1 part in 10^6 0-50°c.

Power sources: 115/230 VAC ±10% 50-400 Hz, 50 W; 11.5—15 VDC, 3 A. **Operating temperature range:** —12°C to +50°C. **Storage temperature range:** —55°C to +85°C. **Scanning time.** approx. 1.5-5 sec. externally adjustable. **Hold time:** approx. 3-10 sec. externally adjustable. **Antenna:** dual rear panel receptacles, UHF type. **Channel Identification:** digital readout display automatic as channels are scanned. **Alarm Modes:** Stop on alarm, alarm, off (reset).

Frequency Counter/Deviation Meter



- 20 Hz-512 MHz inclusive in two ranges.
- Special low frequency, high resolution ranges provide high accuracy readouts for measuring low frequencies such as "PL" tones.
- Measure tone frequencies "off-the-air."
- 8 digit in-line readout.
- Automatic decimal point positioning.
- Resolution to .001 Hz in 1 second.
- Optional high stability oscillator or TCXO.
- High sensitivity of 50 millivolts.
- Battery Option.

Two versions of the Motorola Frequency Counter are available: the S-1343 series counter only and the S-1344 series incorporating an auto tuning deviation meter for simultaneous frequency and deviation measurements. A wide variety of oscillator and power supply options allows you to custom design an instrument to suit your servicing needs. All units are supplied complete with manuals, antennas, cover, and other required accessories.

Wide Frequency Range

These units provide continuous frequency coverage from 20 Hz to 512 MHz in two ranges. And you can measure any two-way radio frequency from 25 MHz to 512 MHz through one input . . . no confusing range switching or cable patching is required. Only a "counter-type" frequency meter can provide instant readout of the exact frequency. In addition to eliminating dial tuning and zero-beating, the response to a signal or a frequency change is essentially instantaneous.

"Off-The-Air" Tone Measurements

After checking frequency and deviation, simply set counter to tone range and depress count tone switch for high resolution tone measurement.

Automatic Protection

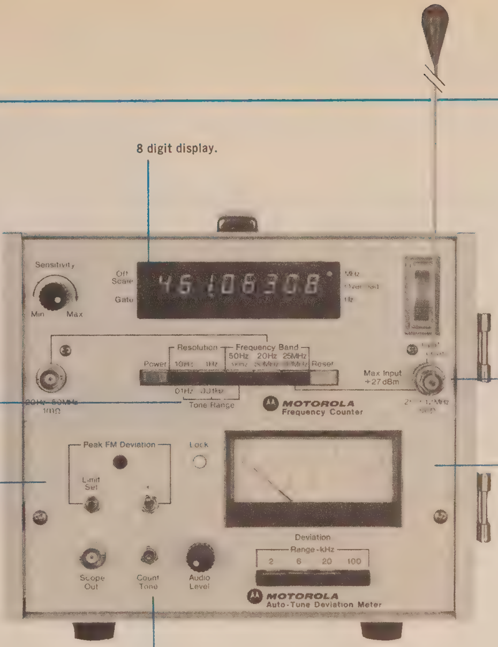
An automatic input protection circuit in 25 to 512 MHz range minimizes the possibility of counter input damage due to accidental overload by high r-f fields. The circuit is reset when the overload condition is reduced or removed. A "strobing" indicator alerts the operator to the overload condition.

SPECIFICATIONS

S-1343 & S-1344 Series Frequency Counter

Frequency Counter

Frequency Ranges: 20 Hz to 50 MHz and 25 MHz to 512 MHz, separate inputs. **Tone Ranges (via 20 Hz to 50 MHz Input):** 50 Hz to 3 kHz (resolution .001 Hz/sec) and 50 Hz to 3 kHz (resolution .01 Hz/0.1 sec). **Accuracy:** ±1 Count &Time Base Accuracy. **Display:** 8 digits plus off-scale indication for overflow. Automatic leading zero suppression. Readings in Hz or MHz with automatic positioned decimal point. Overhead indicator. Display storage holds readings between samples. **Input Characteristics 20 Hz to 50 MHz Input And Tone Ranges:** *Impedance:* 1 Megohm shunted by 25 PF. *Coupling:* AC. *Attenuator:* Variable sensitivity control. *Maximum Input:* The following voltages may be applied without damage; 500 V Peak (DC plus AC component; 250 V RMS, 20 Hz to 10 kHz; 50 V RMS, 10 kHz to 2 MHz; 10 V RMS, 2 MHz to 50 MHz. **Input Characteristics 25 MHz to 512 MHz Input Range:** *Input Impedance:* 50 Ohms nominal. *Coupling:* AC. *Maximum Input:* +27 dBm, overload protected. Voltage in excess of approximately +27 dBm resets display. Panel meter indicates approximate correct level for input signals. **Standard Time Base:** *Aging Rate:* ±3 parts in 10^7 per month. *Temperature Stability:* ±5 parts in 10^6 from 0 to +50°c, typical ±2 x 10^6 from 20 to +40°c. *Line Voltage:* ±1 x 10^7 for a 10% line variation. *External Input:* 1 MHz, 1 V Rms into 500 Ohms. *Sensitivity:* 50 MV Rms. **General:** *Dimensions:* 7″ H x 8⅜″ W x 12½″ D. *Weight:* 12 lbs. *Power:* 115 or 230 vac, rear panel selectable 50-440 Hz 22W.



8 digit display.

Tone range for easy, high resolution tone measurement.

50 mv rms sensitivity.

Auto tuning deviation meter.

Simultaneous frequency and deviation measurements.

Simply depress **count tone** switch for high resolution tone measurements (from discriminator output to counter).

The standard deviation meter incorporated in the S-1344 Series is not dpl compatible. If desired a dpl modification kit can be easily installed. However, meter response time increases substantially and the kit is not recommended unless dpl applications will be encountered.

PK-809 DPL kit

SPECIFICATIONS

Deviation Meter (S-1344 series only)

Frequency Range: 25 to 512 MHz **Sensitivity:** 50 MV Rms **Residual FM:** Less than 150 Hz at 512 MHz. **Deviation Ranges:** 2, 6, 20, and 100kHz peak full scale (select + or —). **Deviation Accuracy:** ±3% of full scale. **Modulation Frequency Response:** flat from 50 Hz to 8 kHz (6, 20 & 100 kHz ranges) and 50 Hz to 3 kHz (2 kHz range). **Internal Speaker:** Level of de-emphasized audio output may be adjusted with the audio level control. **Scope Output:** Provides a linear audio output into a 10 kilohm load. **Over Deviation Indication:** Adjustable visual indication of excessive deviation. **Count Audio:** Momentary front panel switch indicates frequency of the tone (from the discriminator output to the counter) for high resolution tone measurements. Deviation must be greater than 25% of full scale range. Resolution 0.001 Hz.

Options Available:

Field or Factory Installable: DC operation ("A" suffix for use with any oscillator option). Internal battery pack ("B" suffix). DC operation ("C" suffix for use with standard oscillator & TCXO option) (DC required: 11-13.5 vdc, @ 2 amps.

Factory Installed Only: TCXO, ±1 x 10^{-6} over 0 to +50°c ("AA" Suffix); High stability oscillator, ±3 x 10^{-9}/day, oven ("AC" suffix)—high stability oscillator not available with internal battery pack.

Standard Models of the S-1343 and S-1344 series counters are listed below for your convenience.

(Power supply kits may be ordered separately for field installation)

		BASIC COUNTER WITH TCXO OSCILLATOR	BASIC COUNTER WITH STANDARD OSCILLATOR	BASIC COUNTER WITH HIGH STABILITY OSCILLATOR	DC POWER SUPPLY (FOR USE WITH HIGH STABILITY OSCILLATOR FOR FIELD INSTALLATION ORDER **SLN-6420A**	INTERNAL BATTERY PACK CAN ONLY BE USED WITH STANDARD OSCILLATOR OR TCXO. FOR FIELD INSTALLATION ORDER **SLN-6421A**	DC POWER SUPPLY (FOR USE WITH STANDARD OSCILLATOR AND TCXO) FOR FIELD INSTALLATION ORDER **SLN-6422A**
	Suffix	(AA)	(AB)	(AC)	(A)	(B)	(C)
S-1343 Series Frequency Counter Only	**S-1343AA**	●					
	S-1343AB		●				
	S-1343AC			●			
	S-1343AAB	●				●	
	S-1343AAC	●					●
	S-1343ABB		●			●	
	S-1343ABC		●				●
	S-1343ACA			●	●		
S-1344 Series Frequency Counter and Deviation Meter	**S-1344AA**	●					
	S-1344AB		●				
	S-1344AC			●			
	S-1344AAB	●				●	
	S-1344AAC	●					●
	S-1344ABB		●			●	
	S-1344ABC		●				●
	S-1344ACA			●	●		

Deviation Instruments

Auto-Tuning Deviation Meter

FEATURES

- Covers 25 MHz to 512 MHz Continuously
- Peak Deviation Measurements to 100 KHz to 4 Ranges (Selectable + or −)
- Scope Output plus Built-In Speaker
- High Sensitivity of 50mV
- Presettable Over-Deviation Indicator

A Motorola's auto-tuning deviation meter is extremely easy to use. The unit is completely automatic. Simply plug it in and apply the signal to be measured. The unit automatically tunes the signal and displays deviation. In addition, a speaker is provided to monitor the audio output and a scope output on the back of the unit allows observation of the deviation waveform. A manually set deviation limit provides a visual indication when the preset limit is exceeded. Deviation readout is selectable in 2, 6, 20, and 100 KHz ranges.

Light weight, portability, and high measurement accuracy combine to make this unique instrument valuable for shop or field use. All units are supplied complete with manual and the SAN-6000A antenna.

R-1007A	Meter, 110V ac
R-1007A/230V	Meter, 230V ac

DIGITAL PRIVATE-LINE Modification Kit

The standard R-1007A deviation meter is not compatible with Motorola's DIGITAL PRIVATE-LINE (DPL) squelch. If desired a DPL modification kit can be easily installed. However, meter response time increases substantially and the kit is not recommended unless DPL applications will be encountered.

PK-809	DPL Kit

SPECIFICATIONS

Frequency Range: 25 to 512 MHz. **Sensitivity:** 50 MV Rms. **Residual FM:** Less than 150 Hz at 512 MHz. **Deviation Ranges:** 2, 6, 20, and 100 KHz peak full scale (Select + or —). **Deviation Accuracy:** ±3% of full scale. **Modulation Frequency Response:** Flat from 50 Hz to 8 kHz (6, 20 and 100kHz ranges) and 50 Hz to 3 kHz (2 kHz range). **Internal Speaker:** Level of de-emphasized audio output may be adjusted with the audio level control. **Scope Output:** Provides a linear audio output onto a 10 kilohm load. **Over-Deviation Indication:** Adjustable visual indication of excessive deviation. **General: Dimensions:** 4″ H x 7¾″ W x 14½″ D. (10 cm x 19.4 cm x 36.3 cm. **Weight:** 7 pounds. (3.15 kg) **Power:** 115 or 230V ac, rear panel selectable 50-60 Hz, 22W.

Deviation Calibrator

B This calibrator provides a convenient and accurate method of checking the baseband calibration of point-to-point receivers.

It does this by means of switchable crystal controlled oscillators which can be set to the I.F. center frequency, high or low peak deviation at the I.F. frequency or switched at an audio rate between high and low peak deviation.

The mixer plug-in is for use in systems that have a 10.7 MHz I.F. amplifier frequency and a transmitter with a 35 MHz test output frequency. A RTC-4002A 10.7 MHz Deviation Calibrator plug-in must be used in conjunction with the mixer to calibrate the I.F. baseband output. The mixer provides a 10.7 MHz output so that the transmitter deviation can be adjusted by looping the 35 MHz transmitter test output through the mixer into a calibrated 10.7 MHz I.F. amplifier.

The unit incorporates modular design so only the frequencies needed for a system need be purchased. The mainframe includes a battery test light which indicates condition of the internal 9 volt batteries. The mainframe is shipped with two blank panels and will accept up to three plug-in modules from the list below.

R-1009A	Deviation Calibrator

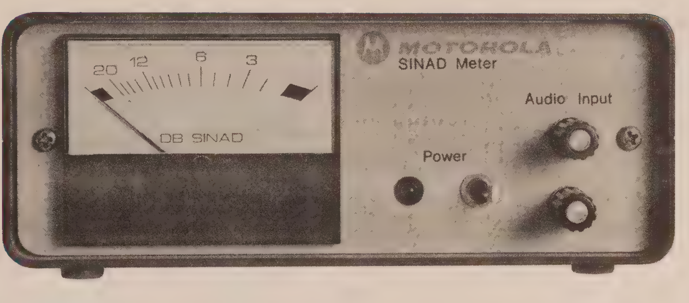
SPECIFICATIONS

Output:—30dBm (nominal). **Battery Drain:** 12 ma. **Battery Life:** 48 hours (with 60-82728J01). **Temperature Range:** —10°C to +60°C (guaranteed).

MODEL NO.	DESCRIPTION	MICROWAVE SYSTEM
R-1009A	Mainframe	
RTC-4002A	10.7 MHz (70 KHz RMS Deviation)	MR100
RTC-4003A	35.0 MHz (400 KHz RMS Deviation)	MR100
RTC-4004A	70 MHz (2.1 MHz RMS Deviation)	MR200, MR30 MR600, MR300
RTC-4005A	Mixer (35 MHz to 10.7 MHz)	MR100

Batteries not supplied, order Motorola Part Number 60-82728J01.

SINAD Meter



Features

- Makes 12-dB SINAD Measurements Automatically
- Built-in Reject Filter and AGC Eliminate Need for Frequency and Null Controls, Level Adjustments and Reference/Distortion Switching
- Just Connect to the Audio Link and Read SINAD Sensitivity Directly
- Use as an Alignment Aid to Speed-Up Alignment Procedures, and Optimize Receiver Performance
- Portable, Rugged, Lightweight, Operates from 12 volts dc or 115/220 volts ac

Now at last, a practical way to make 12-dB SINAD receiver sensitivity measurements and improve system performance.

The Motorola R-1013A SINAD Meter is a specialized distortion meter for automatic 12-dB SINAD receiver sensitivity measurements. It represents a new concept in receiver servicing. Just connect the meter to the audio output, adjust the FM signal input (from a Motorola R-1201 Series Signal Generator, Motorola R-1200A series Service Monitor or equivalent) for a 12 dB reading on the SINAD Meter and read sensitivity directly from the Signal Generator. It's that simple! No frequency or null controls to set, no level adjustments and no switching back and forth between reference and distortion functions.

Features ● Benefits

Makes 12-dB SINAD Measurements Automatically The 12-dB SINAD receiver sensitivity measurement is the most meaningful measurement of FM receiver performance. It is repeatable and the measurement relates to the actual performance of a receiver under voice modulated conditions.

Use as an Alignment Aid to Speed-Up Alignment Procedures and Optimize Receiver Performance As an alignment aid the Motorola R-1013A can be used to touch up alignment adjustments for improved sensitivity and better overall system performance. For example, an improvement in receiver sensitivity from .5 microvolts to .35 microvolts is equivalent to doubling transmitter output power. The R-1013A SINAD Meter can be used with AM receivers as well as FM receivers. When necessary, such as when alignment procedures are unavailable, the R-1013A SINAD Meter alone may be used to completely align a receiver.

Built-in Reject Filter and AGC Eliminate Need For Frequency and Null Controls, Level Adjustments, and Reference Switching A reject filter preset at the EIA defined 1 kHz SINAD test frequency eliminates the need for frequency and null controls. The AGC circuit permits the instrument to operate over an input voltage range of from 40 millivolts to 10 volts rms without the need for level adjustments and reference switching. Ease of operation means fast, efficient servicing. In fact, it is the automatic operation and the elimination of interacting controls that now make 12-dB SINAD measurements practical.

Portable, Rugged, Lightweight, and 12-volt DC Operation Allows the R-1013A SINAD Meter to be used in a service van for on-site servicing.

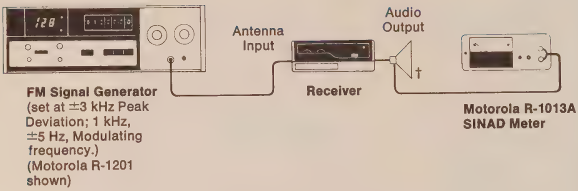
Accurate Precision circuits provide accurate, repeatable receiver sensitivity measurements. Sensitivity measurements made with the Motorola R-1013A SINAD meter will correlate to within 1 dB to sensitivity measurements obtained by using more complex and expensive distortion meters.

R-1013A	SINAD Meter, 115 VAC
R-1013A/230V	SINAD Meter, 230 VAC
SKN-6001A	Test Cable, dual banana plug with Alligator Clips (order separately).

SPECIFICATIONS:

Input Level: 40 millivolts to 10 volts rms. **Input Connector:** six way binding posts. **Input Impedance:** 100k ohm in parallel with 50 pf. **Accuracy:** ±1 dB. **Notch Filter:** 1 kHz ±5 Hz (note preset audio oscillators must be within this range for accurate measurements). **Power:** 115/230 VAC, ±20%, 50/60 Hz strap selectable. 13.8 VDC, ±20%. On/Off Switch with LED indicator. **Size:** 7″ x 7$\frac{3}{16}$″ x 2¾″. **Weight:** 2¾ lbs. (1¼ kg). **Temperature Range:** 0° to +45°C (operating) −10°C to +55°C with accuracy degradation to ±2 dB. **Accessory:** SKN-6001A test cable, dual banana plug with Alligator clips.

Easy to Use!


Antenna Input
Audio Output
Receiver
†
FM Signal Generator (set at ±3 kHz Peak Deviation; 1 kHz, ±5 Hz, Modulating frequency.) (Motorola R-1201 shown)
Motorola R-1013A SINAD Meter

1. Set Signal Generator on channel frequency, modulate with 1 kHz audio tone (±5 Hz), and set peak modulation deviation to ±3 kHz.
2. Insert strong signal into receiver and set volume control to comfortable level.*
3. Decrease Signal Generator level until SINAD Meter reads 12 dB.
4. Read 12-dB SINAD sensitivity from Signal Generator attenuator.

*This is a suitable, simplified, procedure for servicing and production line testing. To obtain SINAD sensitivity exactly to EIA specifications (RS-204-A), volume should be set at rated audio output.

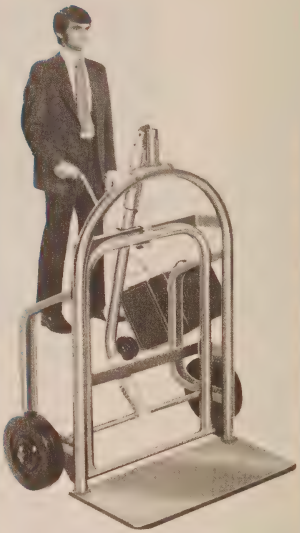
†Note when connecting the SINAD meter to the speaker jack of a radio, care must be taken to properly terminate the radio in its appropriate speaker impedance.

The Importance of Receiver Sensitivity

Unlike transmitter power output, receiver sensitivity frequently does not get sufficient attention when servicing two-way radios. For example, a 60-watt transmitter that only delivered 50 watts would probably cause more concern than a .35 microvolt receiver that only measured .5 microvolt sensitivity. The difference in transmitter power is only .8 dB while the difference in receiver sensitivity is equivalent to 3 dB. A 3 dB system degradation is the same as halving transmitter output power. Thus it is very important that receiver sensitivity be measured and maintained for optimum system performance.

Unfortunately, one of the most common methods of measuring receiver sensitivity, the 20-dB quieting method, only measures the ability of the receiver to receive a CW signal and not the ability to receive and deliver a modulated signal. In fact, the 20-dB quieting method can be misleading in many cases where the receiver is aligned for a peaked response. The 20-dB quieting method may give a very good sensitivity measurement in such a case even though the receiver is not aligned for best reception of a *modulated signal*.

The better method for measuring sensitivity is the 12-dB SINAD (Signal plus Noise And Distortion) method. This measurement is made with a frequency-modulated signal, and includes noise and distortion, more closely approximating actual operating conditions than the 20-dB quieting method. The primary reason for the popularity of the 20-dB quieting method, over the 12-dB SINAD method, is that prior to the introduction of the Automatic SINAD Meter, the SINAD method was more time consuming and required an expensive general purpose distortion meter. Now, however, with the use of the Motorola R-1013A SINAD Meter, 12-dB SINAD measurements can be made quickly and accurately and alignment adjustments can be optimized for improved receiver performance.



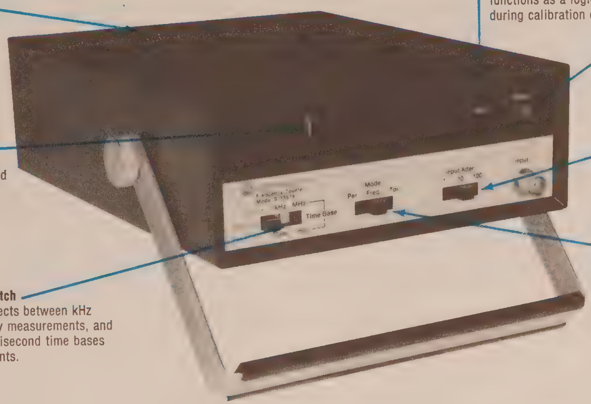
Folding Hand Truck

This convenient folding hand truck is ideal for transporting tool kits, parts, and test equipment to servicing locations. Hinged handle locks into place during use. Nose bar may be placed in either up or down position depending on depth of load. Truck folds to 24″ H x 17″ W x 12″ D dimensions for easy storage in an automobile trunk, station wagon, or service van. Unfolded dimensions are 43½″ H x 17½″ W x 20″ D with handle and nose bar extended.

The frame's all-welded construction is formed from ⅞″ O.D. x 16-gauge steel tubing. Stair glides are made from steel channel for easing loads down stairs or curbs. Vinyl hand grip gives positive load control. Comes equipped with easy rolling 5″ diameter solid rubber ball bearing wheels. Weight of truck is only 18 pounds. Load capacity is 200 pounds.

RSX-4013A Folding Hand Truck

S-1357 Frequency Counter



12 Volt Operation
Rear panel connector permits use of any 12-volt DC power source.

Overrange Indicator
Indicates when the number to be displayed is larger than the display can handle.

Power/Time Base Switch
Turns the unit on, selects between kHz and MHz for frequency measurements, and selects second or millisecond time bases for period measurements.

Gate Lamp
Flashes on when the display is updated. Also functions as a logic probe for troubleshooting during calibration or servicing.

Reset Switch
Pushbutton switch resets the display to zero in any mode of operation.

Input Attenuator
Three-position switch provides ÷ 1, ÷ 10 or ÷ 100 attenuation of the input signal.

Three Operating Modes
Modes for frequency measurement to 30 MHz, period measurements to 99.999 seconds, or totalize for events counting to 99,999 are easily switch-selected.

S-1357 Frequency Counter

The most versatile counter ever . . . displays frequency to 30 MHz, period to 99.999 seconds, counts events to 99,999. It's a full five-digit counter, will also function in period or totalize modes, and provides built-in input attenuation and 12-volt operation in one compact package.

As a frequency counter, the S-1357A reads to 30 MHz with 1 Hz resolution. Sensitivity is a low 15 mV from 50 Hz to 30 MHz, 50 mV below 50 Hz.

In the period mode, intervals up to 99.999 seconds can be measured. Using the millisecond time base, the S-1357A resolves to 1 μsec! This mode can be used for low frequency measurements with high accuracy. Just position the TIME BASE switch to mS and the MODE switch to PER. Then solve the equation f = 1/period, using the displayed value.

The totalize mode will add up (totalize) event pulses up to a count of 99,999. Pushing the RESET button starts the count at zero. An inhibit signal can be applied through a rear panel terminal to stop the totalize mode at any time, without loss of the displayed count.

The front panel attenuator switch allows the amplitude of input signals to be divided by 1, 10 or 100. The pushbutton RESET switch quickly resets the display to zero in any mode. Front panel display includes overrange indicator and a gate lamp.

A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for the external time base signal, or as an output to check the internal 10 MHz time base or provide a convenient frequency standard of 1 MHz for bench use. Operation from any 12-volt DC source is possible with no extra accessories. Power is applied through a rear panel connector (mating connector supplied).

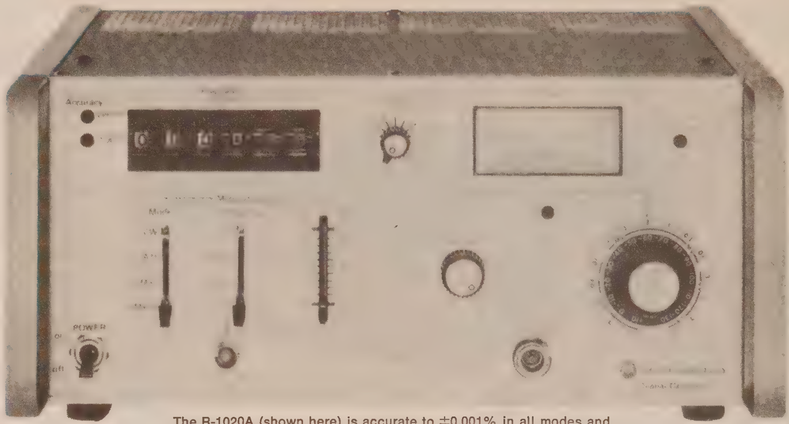
SPECIFICATIONS

S-1357A Frequency Counter

FUNCTION: Frequency: 5 Hz to 30 MHz. **Period:** 1 microsecond, resolution to 99.999 seconds. **Totalize:** 1-99,999 events.

INPUT—Frequency Range: 5 Hz to 30 MHz minimum. **Sensitivity:** 15 mV rms (50 mV, 5 Hz to 50 Hz). **Period Pulse Width:** 25 nsec minimum. **Low Frequency Signal Risetime:** 1 μsec for signals less than 10 Hz. **Input Impedance:** 1 megohm shunted by less than 35 pF. **Protection:** 250 volts rms at 60 Hz. **Attenuator:** X1, X10, X100 fixed compensation. **TIME BASE—Frequency:** 10 MHz. **Setability:** ±1ppm. **Temperature Stability:** ±10 ppm, maximum 0° to 40° ambient. **OSCILLATOR CONNECTION—External Input Frequency:** DC to 20 MHz. **External Input Sensitivity:** TTL or 2.5 Vrms from 50-ohm source. **Internal Output:** TTL signal at 1 MHz. **GENERAL—Gate Interval:** kHz-1 sec, MHz-1 μsec (indicated by gate light). **Manual Gate:** DC control in events mode using external OSC input connector. **Display Time:** 200 μsec plus gate interval. **Power Requirements:** 105-130 or 210-260 VAC (switch selected), 50/60 Hz, (at 25 watts); or 9-14 VDC at 1.25 amperes. **Dimensions:** 2¾" H X 7¼" W X 9" D (less handle.)

Signal Generators



The R-1020A (shown here) is accurate to ±0.001% in all modes and allows frequency to be fine tuned in the FM mode.

FM/AM Signal Generator

• Two models to choose from • R-1020 Series is accurate to ±0.001% in all modes and allows frequency to be fine tuned with vernier control in FM mode • Simplified Operation • Electronic overload protection (Reverse Power Protection of output circuit) • Extremely low RF spray and leakage • Generates all IF and RF frequencies from 450 kHz to 520 MHz • Full 1 volt RF output is precisely leveled • AM and FM modulation capability • R-1010 will satisfy most two-way radio servicing needs at lower cost.

Simplified Operation

Especially designed for ease of setting receiver frequency, the low frequency drift and multiple features make both units ideal for two-way radio servicing. No cluttered front panels with range switches, modulation meters, and level set controls. The front panel layout is self-explanatory.

The calibrated output is leveled to within ±0.75 dB across the frequency range of 1 MHz to 520 MHz. The "Unleveled" indicator will illuminate if the output level accuracy falls outside the specifications of the unit. Exceptionally fast turn-on. When the front panel "Accuracy" lamp stops flashing (usually within 5 seconds), you are phase-locked to the reference crystal. No need for a counter.* No need to range switch. Simply dial in the desired frequency to a resolution of 1 kHz. The "Accuracy" lamp indicates the unit's specification.

Both units feature both internal and external amplitude and frequency modulation capabilities. Internal AM and FM modulation frequencies of 400 Hz and 1 kHz are available. In the AM mode of operation, amplitude modulation to 90% is attainable. In the FM mode of operation, peak deviations up to 50 kHz are attainable.

The slide control potentiometer allows precise settings of AM percent modulation or FM frequency deviation in accordance with the corresponding "Modulation Mode/Freq" switch positions. This feature eliminates the need for an additional meter on the front panel. The modulation control and readout are one and the same. This same potentiometer also can serve as a manual amplitude frequency control when the "Modulation Freq" switch is in the "DC" position ("Vernier" on R-1010A). When the "Mode" switch is in the "AM" position, the slide potentiometer can provide up to a +6 dB increase in output amplitude. With the "Mode" switch in either of the FM positions, the slide potentiometer provides up to a 5 kHz or 50 kHz increase in frequency to the CW signal indicated on the lever/indicator switches.

The FREQUENCY VERNIER control on the R-1020A series provides the user with the ability to fine tune the dialed-in frequency ± 5 kHz. When the unit is taken out of the CAL position, the VERNIER ACCURACY lamp illuminates indicating that the accuracy is other than ±0.001%.

Modulation Flexibility

The standard frequency deviation ranges (5 kHz and 50 kHz peak) were chosen to satisfy the majority of FM test applications in the communication fields. A 1.0 volt RMS signal into the external modulation input connector calibrates the deviation control for 5 kHz or 50 kHz full scale, depending on selection of either the FM x 1 or FM x 10 mode. If increased resolution is desired over any other specific range, select the FM x 1 mode and simply decrease the input voltage level of the external modulation signal by a factor of 10. For example, if a particular test calls for approximately 300 Hz deviation, you can calibrate the front panel for 500 Hz full scale by selecting the FM x 1 mode and reducing the external modulation input signal to 0.1V RMS. With this same input level, the FM x 10 mode is now calibrated for 5 kHz full scale. This is an ideal feature for use on tone coded radio receivers.

Modular Construction

In addition to the shielding benefits it offers, the modular approach also greatly enhances the servicing and maintainability of the instrument. Troubleshooting is simplified through the use of built-in-test indication techniques. If the output RF signal loses phase-lock, the front panel "Accuracy" lamp will flash. Several of the modules contain LED indicators. By removing the unit's top cover and looking for the module with an illuminated LED, you can quickly identify the portion of the over-all instrument circuit that is malfunctioning. All modules are field replaceable.

IF Capability

This generator will provide IF test frequencies as low as 450 kHz which eliminates the need for a separate box or optional add-on to generate these needed frequencies.

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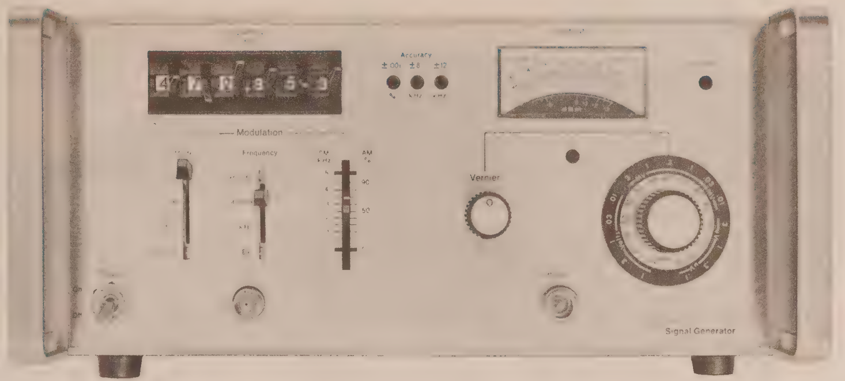
*In some applications of radio servicing a frequency counter may be required. Such as: Base stations with high stability oscillators or paging receivers which require the IF frequency to be counted in order to set the receiver on frequency.

Signal Generators



Lower cost R-1010A (shown here) will satisfy most two-way radio servicing needs.

Accurate

Although the frequency accuracy indicated by the front panel lamp is ±0.001% of the frequency setting, this accuracy includes long term drift, short term drift during warm up, incidental FM, and variations due to power line and temperature changes.

The typical accuracy after a two hour warm up is much improved, in the order of ±0.0002% of frequency setting. Once the frequency is calibrated to this accuracy (after a two hour warm up at 25° C), the ±0.0002% accuracy can be achieved for time periods up to three months.

Electronic Overload Protection

(RF Reverse Power Protection)

Prevents damage to the Signal Generator if an RF (transmitter) is keyed into it or a dc source is inadvertently connected to the output. This eliminates the need for external pads or changing fuses.

Low RF Leakage or Spray

Both signal generators meet an extremely rigid spray specification. Special RF leakage and spray reduction circuitry is incorporated into the generator at no extra cost. This ensures no detectable spray when servicing the most sensitive paging receivers.

R-1010A	Signal Generator, 115V ac
R-1020A	Signal Generator, 115V ac
R-1010A/230V	Signal Generator, 230V ac
R-1020A/230V	Signal Generator, 230V ac
RTK-4005A	RF Test Cable, N to UHF Type Connector, 30″ long
RTK-4004A	RF Test Cable, N to BNC Type Connector, 30″ long

SPECIFICATIONS

Frequency:

Range: 450 kHz to 520 MHz selectable in 1 kHz steps. (450 kHz to 1.0 MHz range has degradation of harmonic residual FM & AM specs.) **Readout:** 6 digit lever/indicator switches. **Resolution:** 1 kHz. **Accuracy:** *R-1010A Series:* CW and AM modes typically—±0.0002% after 2 hours; ±0.001% after 5 minutes. FMX1 Mode—±0.001% ±8 kHz after 5 minutes; ±0.001% ±12 kHz after 5 minutes. *R-1020A Series:* Typically ±0.0002% after 2 hours; ±0.001% after 5 minutes all modes (±0.001% ±10 kHz when "Frequency Vernier" is not in "Cal" pos.). **Stability:** *R-1010A Series:* CW and AM Mode—0.2 ppm/hr; FMX1 Mode—500 Hz per 10 minutes. *R-1020A Series:* 0.2 ppm/hr all modes (500 Hz per 10 minutes when "Frequency Vernier" is not in "Cal" pos.).

RF Output:

Power Level Range: +13 dBm to −137 dBm (1V to 0.03μV/RMS). **Level Control:** Continuously adjustable in 10 dB steps and with an 11 dB vernier. Output level is indicated on a front panel meter calibrated in volts and dBm. **Total Level Accuracy:** +13 to −7 dBm, ±1.25 dB, −7 to −77 dBm, ±1.95 dB; −77 to −137, ±2.75 dB. **Accuracy Breakdown:** Flatness (+13 to −7 dBm) ±0.75 dB; Output Meter ±0.5 dB; Step Attenuator ±0.5 dB to 70 dB (±0.2 dB calibration error) ±1.0 dB to 130 dB (±0.5 dB calibrator error). **Impedance:** 50 ohm (SWR <1.2 at RF output levels below 0.1V).

Leakage:

Easily meets MIL-1-618D and also much more stringent spec as follows:

RF leakage or radiated spray shall be at such a low level as not to cause the level at the I.F. test point of a sensitive paging receiver (Motorola A04FNC with .2 μV sensitivity) to change more than 0.5 dB when the following conditions exist:

Pager is in TEK-69 radiation fixture (pager to be 6″ or more from front of generator) connected to the RF output of the generator with the attenuator set at minimum output and frequency set to that of the pager. The pager's I.F. test point monitored with an S-1053 ac voltmeter.

Spectral Purity:

Harmonic Output: >30 dB below fundamental from 10 to 520 MHz; >20 dB below fundamental from 1 to 10 MHz. **Sub-Harmonics:** Non detectable.

Non-Harmonics:

Fundamental	Spurious Level
1 to 3 MHz	⩾60 dB in 1 to 3 MHz band
3 to 250 MHz	⩾65 dB in 3 to 250 MHz band
3 to 350 MHz	⩾55 dB in 3 to 350 MHz band
3 to 520 MHz	⩾35 dB in 3 to 1000 MHz band

Residual AM: ⩾55 dB below carrier in a 50 Hz to 15 kHz post-detection bandwidth. **Residual FM:** ⩽ 200 Hz in a 50 Hz to 15 kHz post-detection bandwidth. Typically ⩽ 100 Hz.
(450 kHz to 1.0 MHz range has degradation of harmonic, residual FM & AM specs.)

Amplitude Modulation:

Frequency: Internal: 400 Hz and 1 kHz ±3%; External: dc to 20 kHz (3 dB bandwidth). A 1.0 volt RMS signal into 600 ohm is required to provide calibrated % modulation control. **Range:** 0-90%. **Distortion:** 3% to 70% AM (5% to 90% AM) at a frequency of 1 kHz. **Modulation Control:** Calibrated from 0 to 100%. **Accuracy:** ±(5% + 5% of reading) at a frequency of 1 kHz.

Frequency Modulation:

Internal: 400 Hz and 1 kHz ±3%; **External:** A 1.0 volt RMS signal into 600 ohm is required to provide calibrated deviation control. *R-1010A Series:* DC to 25 kHz (1 dB bandwidth). *R-1020A Series:* 50 Hz to 25 kHz (±1 dB bandwidth). DC to 25 kHz when "Frequency Vernier" is not in "Cal" pos. **Peak Deviation:** Two bands, 0 to 5 kHz and 0 to 50 kHz. **Deviation Control:** Calibrated from 0 to 5 kHz, x1 and x10. **Accuracy:** ±250 Hz on x1 range; ±3500 Hz on x10 range. **Distortion:** 4% (3 to 50 kHz deviation) at a frequency of 1 kHz.

Operating Temperature:

25°C ±5°C all specifications apply; 25°C ±15°C slight degradation of specs. **Note:** Generator may not operate above 45°C or below 5°C.

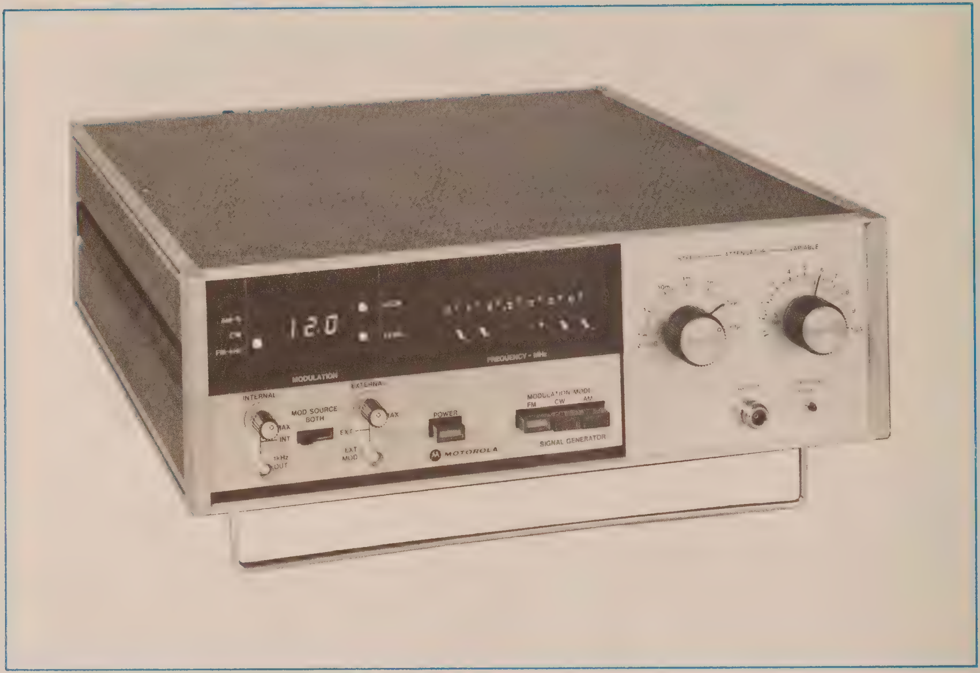
Reverse Power Protection:

RF input is protected against damage from accidental RF power inputs to 110W.

Mechanical:

Output Connector: Type N. **Dimensions:** 12 in./30.3 cm wide; 5¼ in./13.4 cm high; 13¾ in./34.9 cm deep. **Weight:** 28.6 lb./13 kg net; 30 lb./13.6 kg shipping. **Power:** 115/230V ±10%; 50/60 Hz; 40VA. Order R-1010A/230V or R-1020A/230V for 230V ac line operation.

R-1201A Series Signal Generator



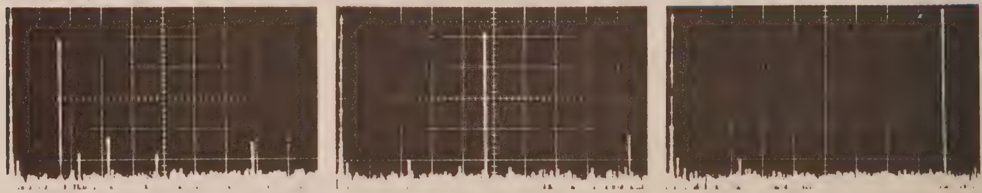
Superb Performance

The R-1201A Series signal generator provides superb state-of-the-art performance. Convenient speed-lever frequency entry provides continuous frequency coverage from 100 Hz to 999.9999 MHz, all on fundamentals. Its advanced design provides the ability to set the synthesizer to 100 Hz increments (4 decimal places) providing direct "dial-up" of the latest 470-512 MHz splinter/tertiary channels. For example, frequencies such as 154.4675 MHz in the special industrial band and 165.0875 MHz in the military band can be set up exactly. *Frequency lock-up is almost instantaneous.* No need to wait for frequencies to stabilize before use. Pushbuttons provide speed and simplicity of operation. The push of a button selects CW, FM or AM generation. Outputs include a single variable RF output, and a variable level precision 1000 Hz signal for modulating a transmitter while setting deviation. IF signals can be generated at the same RF output connector. The 1 volt high level RF out lets you get through detuned circuits for fast, efficient receiver servicing.

With the R-1201-A you can simultaneously modulate the signal generated with an internal 1000 Hz and an external "Private-Line" (PL) tone or "Digital Private-Line" (DPL) code. The ability to observe the deviation on a digital display is especially significant.

Based on Motorola's years of experience in FM communications technology, the Motorola signal generator is the most advanced instrument of its type available today. It will totally support new high frequency systems to 1000 MHz. State-of-the-art and integrated-circuit design make the instrument obsolescence proof against future servicing needs, FCC requirements, and variations in International Standards.

Actual photographs of spectral displays showing fundamental frequencies and their related harmonics.



151 MHz Signal **Harmonic 30 dB Down**

451 MHz Signal **Harmonic 34 dB Down**

851 MHz Signal (No visible harmonics)

Features Include:

"Clean" Output Signal—Spurious signals are at least 40 dB below the desired output at all amplitudes below 110 MHz and this improves to 50 dB down above 110 MHz. Harmonics are at least 25 dB below the fundamental. Purity is not degraded when reducing the amplitude of the desired signal. Output is actually clean enough to drive a counter. This greatly enhances utility and versatility.

High Level Output At All Frequencies—A full 1V rms is available (into a matched 50 ohm load) from below 10 kHz to 999.9999 MHz. The output is leveled. Attenuation is accurate.

ALL RF Signals From One Connector—Only a single output connector, and a single set of controls, are required for all RF output signals (including IF). Calibration and modulation settings remain valid over the entire range. Output is accurate and clean.

Fully Shielded Synthesizer—The signal generator does not generate RF spray and is unaffected by ambient RF. Usefulness in the service environment is increased and the integrity of the attenuator setting is further insured.

Electronic Overload Protection—Prevents damage to the synthesizer if an RF (transmitter) or dc source is inadvertently connected to the output. A front panel pushbutton provides convenient reset. This eliminates external pads or the need for fuses.

AM, FM and CW Output—Either internal or external modulation, or both, is selected by a convenient front panel switch.

All Band Capability—Spectral purity, attenuator accuracy, RF shielding and other features permit the R-1201A to effectively service systems in all frequency bands.

Digital Capability—Both the frequency and amplitude modulators are dc coupled. All recent digital information systems may be serviced.

Multiple Tap Power Transformer—A simple internal jumper plug allows quick selection of the following ac line voltages: 100, 115, 125, 200, 230, 250.

LED Indicators—Light-emitting diodes are employed for long life and reduced maintenance.

Improved Physical Packaging—Removal of two panels, allows access to all internal parts.

R-1201A	Signal Generator with Standard Oscillator
R-1201AT	Signal Generator with TCXO Oscillator
R-1201AX	Signal Generator with High Stability Oscillator
RTK-4005A	RF Test Cable, N to UHF type connector, 30″ long
RTK-4004A	RF Test Cable, N to BNC type connector, 30″ long

Specifications

Operating Modes: AM, FM, CW

Frequency:

Range: 100 Hz to 999.9999 MHz. **Display:** 7 digits individually selectable, rapid lever type. **Resolution:** 100Hz. **Accuracy:** Equal to accuracy of reference oscillator.

RF Output (Levelled into 50 ohms)

Range: 0.1 µV to 1 V RMS −127 dBm to +13 dBm

Flatness*: (@ 0.5 µV and 25°C)
100 kHz—250 MHz:
Typical ±0.5 dB
Maximum ±1 dB

250 MHz—550 MHz:
Typical ±0.7 dB
Maximum ±1½ dB
550 MHz—1000 MHz:
Typical ±1 dB
Maximum ±2 dB

Accuracy:**

100 kHz—550 MHz:
0 dB, Uncalibrated
Steps 20, 40, 60, 80 dB, ±1 dB
100, 120 dB, ±1½ dB.

550 MHz—1000 MHz:
0 dB, Uncalibrated
Steps 20, 40, 60, 80 dB, ± 1½ dB
100, 120 dB, ±2 dB

Temperature Variance:
±0.5 dB additional over 0-55°C

Spectral Purity:

Harmonics: ≦−25 dBc. **Non-Harmonic Spurious: 100 kHz—110 MHz:** ≦−40 dBc. **110 MHz—1000 MHz:** ≦−50 dBc. **Noise: Residual FM (.1 to 3 kHz BW): 100 kHz—500 MHz:** ≦50 Hz RMS. **500 MHz—1000 MHz:** ≦100 Hz RMS. **Residual AM: (.1 to 3 kHz BW):** ≦.1% at +13 dBm. **1 Hz BW noise at 50 kHz offset: 100 kHz—500 MHz:** ≦−103 dBc. **500 MHz—1000 MHz:** ≦−97 dBc. **Attenuator:** 20 dB variable, 20 dB steps over 6 ranges. **Output Impedance:** 50 ohms, nominal. **Output Connector:** Type N.

Amplitude Modulation:

Range: 0 to 90% at output setting of +7 dB on vernier attenuator. **Rate:** 0 to 10 kHz. **Internal Rate:** 1 kHz fixed. **Pulse Response:** ≦10 µS rise and fall. **Indicator Accuracy:** 3% of reading, ±100 Hz. **Resolution:** 10 Hz. **Distortion (@ 1 kHz rate): at 30% modulation:** .6% typical, 1.2% max. **at 70% modulation:** .5% typical, 2.5% max. **at 90% modulation:** 1% typical, 5% max. **External Input:** 2 V peak for 100%, BNC connector. **Impedance:** 600 ohms. **Incidental FM:** (at 30% AM, 1kHz rate): ≦90 Hz. **Modes:** Internal, external or both simultaneously.

Frequency Modulation

Internal Rate: 1 kHz fixed. **Deviation:** 0 to 20 kHz peak. **Rate:** DC to 15 kHz. **Pulse Response:** ≦40 µS rise and fall. **Indicator Accuracy:** ±3% of reading, ±100 Hz. **Resolution:** 10 Hz. **External Input:** 2 V peak for 20 kHz peak deviation, BNC connector. **Impedance:** 600 ohms. **Distortion:** at 20 kHz deviation, 1 kHz: ≦1.2% at 20 kHz deviation, 15 kHz rate: ≦2.6% at 10 kHz deviation, 15 kHz rate: ≦1%. **Incidental AM:** (at 20 kHz deviation, 1 kHz rate): ≦1%. **Modes:** Internal, external or both simultaneously.

General:

Time Base Aging Rate: ±7 x 10^{-9}/45 days standard. **External Reference Input:** 1, 5 and 10 MHz. **Warm-up:** Allow 10 minutes for instrument and for time required to stabilize heated reference oscillator (if used). **Internal 1 kHz Output:** Level: 0 to 2 V peak Distortion: ≦1% Connector: BNC. **Output Protector: Trip:** Approx. 10 V peak ±DC and AC to 1000 MHz. **Reset:** Pushbutton. **RF Leakage:** At level not to increase IF output test point of a Motorola AO4FNC pager (0.2 µV sensitivity) by more than ½ dB when placed 12 inches (30.5 cm) in front of unit developing 0.5 µV output into a shielded termination. **Power:** 100, 115, 125, 200, 230, 250V ac, 50-60 Hz, 75 watt max., plug programmable. **Indicators:** Modulation Lock—Frequency Leveled—RF Output Mode—AM, FM, CW. **Temperature:** Operating: −12° to +55°C (10° to 131°F). Storage: −55°C to +85°C (−67° to 185°F). **Weight:** 40 lb (18,2 kg) net; 52 lb (23.6 kg) shipping. **Dimensions:** 16¾″ wide, 18¾″ deep (with cover), 5¼″ high (42,6 cm wide, 46,6 cm deep, 13,3 cm high).

Ordering Information:

Options: "T" TCXO, ±1 part in 10^{9}/day, 1 x 10^{-6}/year "X" High stability oscillator ±3 x 10^{-9}/day.

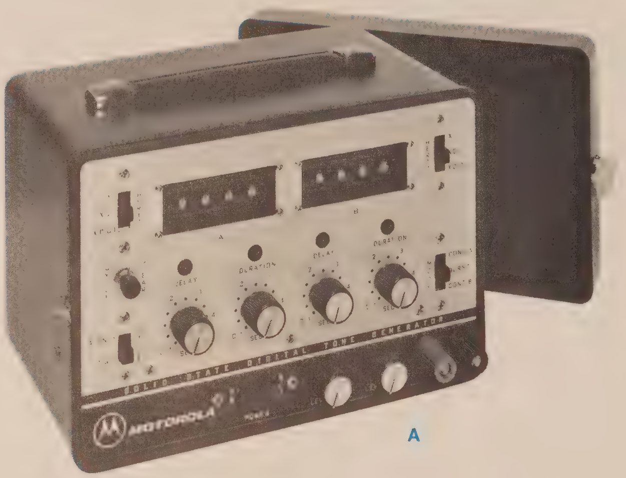
On your order, please specify line voltage required. Voltages may be altered in the field with the appropriate code plug transformer strapping kit (Order separately).

100V—**RPX4016A**
115V—**RPX4017A**
125V—**RPX4018A**
200V—**RPX4019A**
230V—**RPX4020A**
250V—**RPX4021A**

*Variance of output as a function of frequency at fixed output setting.

**Additional one-time inaccuracy when switching from range to range.

Synthesizer



A

Digital Two-Tone Sequential Synthesizer

• Synthesizer accuracy (TCXO) • Thumbwheel frequency selection • Automatic tone burst sequencing • Independent variable tone duration • Continuous tone output • Independent variable inter-tone delay • True zero delay • Independent tone level controls • Low distortion sinusoidal output • Visual timing indicators • Slave units in series or parallel for simultaneous or sequential tone systems.

A This instrument provides audo signals over the frequency range of 10 Hz to 10 kHz with the desired frequency set via thumbwheel switches and crystal controlled for a high degree of accuracy and stability. Resolution switches allow selection of 1 Hz, 0.1 Hz, and 0.01 Hz measurements. These two features make the Synthesizer ideal for generating the exact frequency needed when servicing tone signalling equipment using reed filters or narrow band active filters.

The Synthesizer has two modes of operation—continued and burst. This allows the unit to be used as an audio oscillator or sequential tone generator. In the sequential mode, the duration and delay intervals of the tones are adjustable. LED's are used as indicators to show actual tone duration and intervals as they occur. Zero delay is also available via switch on rear panel.

In the sequential mode, this unit can aid in servicing the following Motorola equipment: Paging equipment — Page Com®, Pageboy®, Pageboy II® (all series); Mobile equipment—Quik Call II®, PL®, System 90 (Micor) Single & Multi PL®.

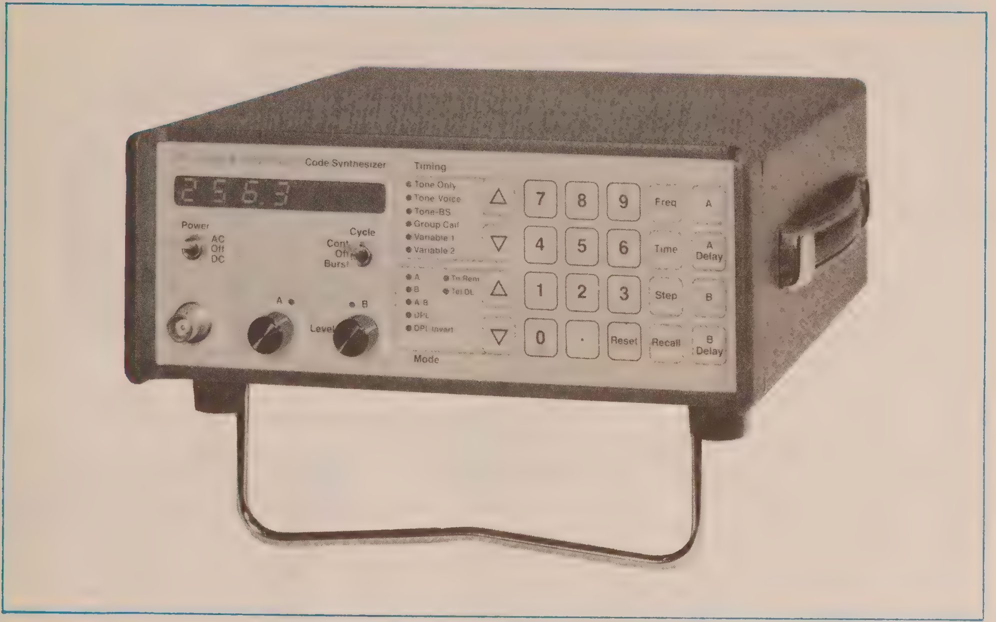
Using the slave feature, this unit can be slaved in series or parallel with another unit to aid in servicing the following Motorola equipment: Quik Call I®, Sel Cal®, and DTMF Encoders.

S-1333B Digital Tone Generator

SPECIFICATIONS:

Frequency: 10.00-99.99 Hz (.01 Hz incr.), 100.0-999.9 Hz (0.1 Hz incr.), 1000-9999 Hz (1 Hz incr.) **Resolution:** 0.1% (four significant digits). **Accuracy:** Plus or minus .001% at 20° C. **Stability:** 2 ppm/°C. **Output:** Sinewave independently variable to 3 v. RMS, 60 ohm load. **Level Control:** −20 dB min. **Distortion:** Less than 1.5%. **Initial Tone Delay:** 0.1 to 5 sec. ±10%. **Inter-Tone Delay:** 0.1 to 5 sec. ±10% (zero delay via two rear panel mounted switches). **Operating Temperature Range:** 0° C to 50° C. **Power Consumption:** 115/230 VAC, 50-60 Hz, 5 Watts. **Weight:** 5 lbs. 8 oz. **Size:** 6″ H x 9″ W x 8″ D (with cover).

Code Synthesizer



Through the use of state-of-the-art microprocessor technology the Motorola Code Synthesizer generates a number of two-tone sequential codes with stored timing intervals as well as a number of other selective signalling codes for servicing the following systems:

- Tone only paging*
- Tone and voice paging*
- Tone only with battery saver paging*
- Group call paging*
- QUIK-CALL II signalling
- Single-tone burst
- PRIVATE-LINE continuous tone coded squelch systems
- DIGITAL PRIVATE-LINE coded squelch systems
- IMTS** telephone dial encoding and 2805 Hz RCC interrupt dialing
- Tone Remote Base Signalling

In addition, the unit can also be used as a 10 Hz to 9.999 kHz general purpose audio oscillator.

The correct time intervals and sequence for all standard Motorola two-tone sequential paging systems, as well as other signalling systems, are stored within the unit. You need only select the desired mode and insert the correct frequencies or other codes. The unit also has provision for temporarily storing the time intervals for up to two additional sequences for other types of two-tone sequential systems. All stored frequencies and time intervals may be recalled and displayed at will. Telephone numbers and DIGITAL PRIVATE-LINE squelch codes are also displayed on the LED readout.

In addition to providing a wide variety of selective signalling codes, with the Motorola Code Synthesizer you can also step through a frequency range in small increments to check circuit band pass, telephone line characteristics, filter tolerance, or center frequency or simply use the unit as a high quality, low distortion audio oscillator. Two units can be slaved to provide simultaneous tone coding.

The Motorola Code Synthesizer is human engineered to provide a logical front panel layout and to minimize the number of controls required. Bail allows unit to be tilted for ease of viewing on work bench and rugged metal case and optional battery pack provide the ultimate in versatility for shop or field use.

Features ● Benefits

Microprocessor and Associated Software—The use of microprocessor technology allows time intervals to be permanently stored within the unit as well as allowing other non standard data to be temporarily stored and recalled at will. Built-in logic precludes the entry of invalid codes. This state-of-the-art technology also allows more features to be economically included in a compact unit, simplifies operation, and provides high reliability by reducing the number of individual components required as compared with discrete component circuitry.

Membrane Keyboard Input—A custom designed membrane keyboard panel for mode selection and data input provides high reliability and resistance to wear and simplifies the user interface. Audible feedback when key is pressed provides positive indication of each key stroke.

LED Digital Readout — Light emitting diodes provide a high reliability display of data during input as well as data recalled from storage. The unit provides for

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*Standard Motorola systems are preprogrammed. Other systems may be operator programmed.
**Improved Mobile Telephone System.

Code Synthesizer

four digit readout of frequency or time intervals, full DIGITAL PRIVATE-LINE squelch codes, and seven digit readout of telephone numbers.

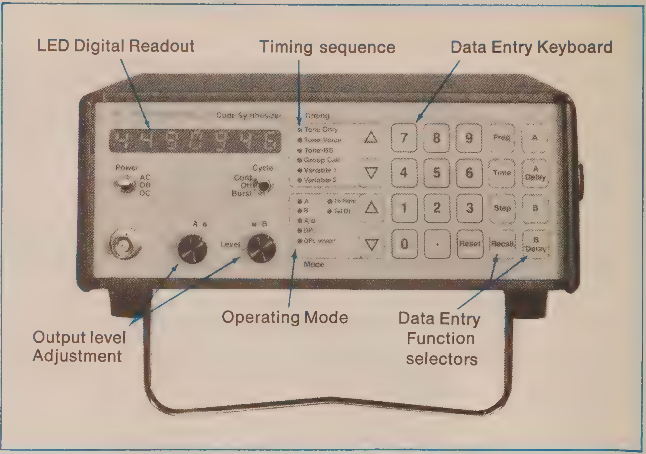
RFI Protection—Circuits are designed to minimize and shield against radio frequency interference (RFI) for reliable operation in the two-way radio servicing environment.

Synthesizer Tone Generation—Synthesizer provides highly stable audio tones accurate to 0.01%. This provides positive assurance that frequency sensitive components in a system are accurately tested to specified tolerances. Frequency range is 10 Hz to 9.999 kHz with four-digit resolution and time intervals are adjustable from 0 sec. to 999.9 sec. to a resolution of one millisecond (0.001 sec.).

Choice of Operating Voltages — Operates from 110V ac or 220V ac 50/60 Hz (via internal power transformer tap) to allow unit to be used with either type of supply voltage without cumbersome external transformers. Unit also operates directly from 12V dc vehicular power source allowing it to be used in a service vehicle at remote locations away from the shop.

Internal Battery Option—Internal battery option allows unit to be used anywhere for extreme servicing flexibility and convenience. Built-in charger operates from 110/220V ac, 50/60 Hz. Unit will operate up to five hours on a fully charged battery and may be recharged overnight.

Optional Accessory—Heavy canvas carrying case RTL-4052A with pocket for storing cables, connectors, etc. protects Code Synthesizer during transport.



R-1100A	Code Synthesizer, 110V ac or 12V dc.
R-1100AN	Code Synthesizer with battery option, 110V ac.
R-1100A/ 220V	Code Synthesizer, 220V ac or 12V dc.
R-1100AN/ 220V	Code Synthesizer with battery option, 220V ac.
RTL-4052A	Carrying case. Consists of one 15-80336A85 case and one 42-80336A86 shoulder strap.
RTL-4053A	600 ohm line matching transformer only. 58-80336A27 adaptor required.
RTL-1003A	600 ohm line matching transformer with 58-80336A27 adaptor.
RTP-1003A	Separate battery pack for field add on.
9-80334A25	Replacement dc plug for 12V dc operation.
28-80334A22	Strobe plug for slaving units together. One required for each unit.

SPECIFICATIONS

Modes:

General audio sinewave oscillator (continuous or burst—single cycle). Single tone. Two-tone sequential. (timing): (pre-programmed stored intervals and sequence) tone only paging* tone and voice paging* tone only with battery saver paging* group call paging* Read/write (volatile) storage for programming two additional time sequences. **DIGITAL PRIVATE-LINE squelch (and invert). IMTS** telephone dial encoding and 2805 Hz RCC interrupt dialing. Tone remote base signaling.**

Frequency:

Range: 10 Hz to 9999 Hz. **Resolution:** ±1 digit. **Distortion:** 2% (3% on dc). **Accuracy (temp.)** 0.01%.

Time Interval:

Range: 0 sec. to 999.9 sec. **Resolution:** ±1 digit.

Accuracy (temp.): .005 sec.

Output Amplitude: 0-3V rms, adjustable.

Operating temp.: 0°—50°C.

Power: 110/220V ac, 50/60 Hz via internal power transformer tap or 12V dc. Optional rechargeable battery and built-in charger available. Operating time on fully charged battery: 5 hours at room temp. of 25°C. Battery may be recharged to over 95% of capacity in 12 hours also at 25°C. **Weight:** Approx. 6 lbs. (2.72 kgm) less optional battery and built-in charger. Add 4 lbs. (1.8 kgm) for battery option. **Size:** 4½" x 9" x 10⅜" (11.4 cm x 22.9 cm x 26.4 cm) including handle and feet. **Standard EIA tests:** RS152B shock and two times RS152B vibration. Same as Motorola mobile radios.

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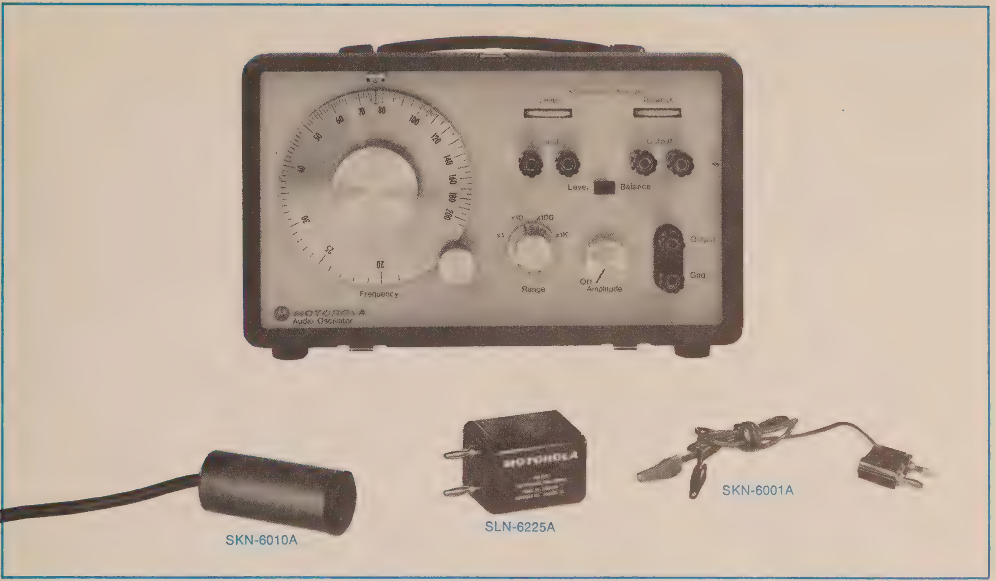
*Standard Motorola paging systems

**Improved mobile telephone system

Solid-State Audio Oscillator



• High Reliability • Laboratory Stability • All Silicon Transistors • Built-in Distortion Analyzer Filter • Lightweight Portable Battery and Line Operated.

Advanced-design Motorola S-1067B Solid State Audio Oscillator is the outstanding answer to the need for a laboratory-quality, compact, lightweight instrument necessary in both shop and field checking of base stations and remote control consoles, setting levels and compensating phone lines.

In addition to serving as a general-purpose audio oscillator, the unit is particularly ideal for maintaining tone-operated systems.

Accessory transformers are available to provide higher levels of output. The SLN-6214A Transformer provides approximately 10 volts rms into a 10-kilohm load to permit modulating FM signal generators or other similar applications. When used with the T-1034 series Motorola signal generator, it will produce 10 kHz deviation.

The SLN-6225A Transformer is designed to match 600-ohm lines and will provide up to 3.5 volts output required when testing compression amplifiers, checking remote control units and when matching into standard telephone lines.

Unique Distortion Analyzer Filter built into the unit simplifies and speeds checking of distortion in receiver audio circuits and amplifiers when used in conjunction with an AC Voltmeter. This feature of the S-1067 Audio Oscillator is required when making EIA SINAD sensitivity and quieting tests specified with most 2-way mobile and base station equipment.

The S-1067B frequency response is typically ±0.3 dB and rated at ±1 dB maximum into 150 ohms or more and represents the small amount of output change that is present as the dial is swept through a range. This is an especially important feature in that continuous monitoring of the input voltage is unnecessary to insure relatively constant output.

117V ac Power Cable — short-circuit-proof transformer molded into the plug . . . low secondary voltage (12 volts rms) brought to the unit via shielded cable minimizes danger of electrical shock and hum pickup normally encountered in conventional 117V ac supplies. Cable supplied with Audio Oscillator. 220V ac Power Cable optional, order separately.

S-1067B	Solid State Audio Oscillator complete with battery and 117V ac power cable. Est. shpg. wt. 9 lbs. (4.05 kg). Est. packaged dim. 8½ x 8¾ x 14¼ in. (21.59 x 22.23 x 36.20 cm).
SKN-6001A	Test Leads Cable Kit with dual banana plug and alligator clips. Est. shpg. wt. 1 oz. (28 gr).
SKN-6010A	117V ac power cable
SKN-6009A	220V ac Power Cable. Est. shpg. wt. 8 oz. (224 gr). Est. packaged dim. 5¾ x 3 x 2 (14.61 x 7.62 x 5.08 cm).
SLN-6214A	Matching Transformer provides 10V rms into 10KΩ load. Not required with S-1318 Series Signal Generators. Est. shpg. wt. 2 oz. (56 gr). Est. packaged dim. 3½ x 2½ x 2½ in. (8.89 x 6.35 x 6.35 cm).
SLN-6225A	Matching Transformer for 600-ohm line. Est. shpg. wt. 2 oz. (56 gr).
60-82457B01	Spare battery, 22½V dry cell.

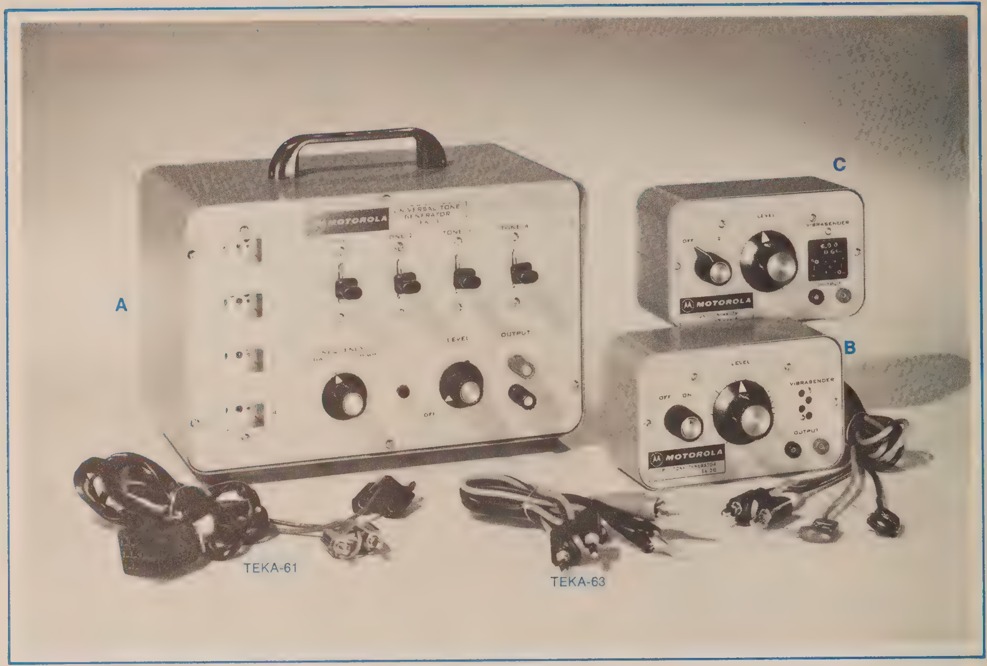
SPECIFICATIONS

Frequency Range: 20 Hz—200 kHz, in 4 overlapping ranges. **Dial Accuracy:** ±5%. **Frequency Response:** ±1 dB into 150 ohms or more (resistive load). **Output Voltage:** 1.5 v rms ±1 dB into 150 ohms; 1.0 v rms (min.) into 50 ohms. **Source Impedance:** Less than 50 ohms at any output voltage level. **Distortion:** Less than 1%*. **Transistor Complement:** One silicon field effect transistor and six silicon transistors. **Battery Life and Type**:** 100 hours. 600 ohms or higher loads with 1 burgess type 4156 (22½V) dry cell or equiv. Part No. 60-82457B01. **AC Input Requirements:** 105-130V ac, 50 Hz-400 Hz at 6 ma approx. can be operated with 230V ac, 50-400 Hz by using SKN-6009A 230/117V ac adapter cable kit (optional). **Filter (1 kHz Distortion Analyzer) Characteristics:** Frequency accuracy = ±5%. 1 kHz rejection = more than 50 dB; input resistance = 600 ohms (approx.). **Operating Temperature:** 0° to +50°C (32°F to 122°F). **Dimensions:** 10¼ x 6½ x 5¾″ (approx.). **Weight:** 7¾ pounds.

*50 Hz to 200 kHz with 150 ohms or higher load at 1.5 v rms max., or 50 ohms at 1 v rms max.

**Based on discharge time of 4 hours per day at room temperature.

Tone Generators



Universal Tone Generator*

117V ac Operation Only

A Use of time and field-proven Motorola "Vibrasender" resonant reeds assures highly stable tones from 67 Hz to 1161.4 Hz for servicing tone coded communications systems. Back of unit has cushioned storage slots for 8 spare "Vibrasender" reeds.

TEK-34A	Two-Tone Generator (less reeds).
TEK-34C	Four-Tone Generator (less reeds). Est. shpg. wt. 11½ lbs. (5.18 kg). Est. packaged dim. 13 x 13 x 13½ in. (33.02 x 33.02 x 34.29 cm).
TEKA-63	Standard Test Cable. Est. shpg. wt. 3 oz. (84 gr).
TEKA-61	Adapter Cable for "Quik-Call" decoder. Est. shpg. wt. 4 oz. (112 gr). Est. packaged dim. 3½ x 2½ x 2½ in. (8.89 x 6.35 x 6.35 cm).

Reed Tone Generators*

Battery Operation

These fully transistorized units provide the necessary tone equipment required when testing tone operated 2-way radio equipment. Generators are designed for use with Motorola "Vibrasender" reeds and provide an output of from 2 to 5 volts depending on reed type.

84-200 Hz Tone Generator

B The TEK-20 Tone Generator is designed to accept the TU-217 "Vibrasender" reed and will operate over the range of 84 to 200 Hz.

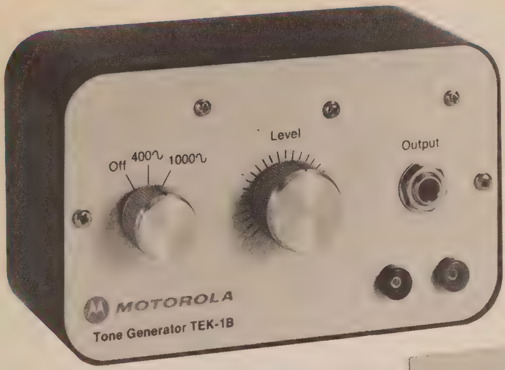
TEK-20	Tone Generator complete W/Batteries & Cables (less reeds). Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 9 x 4¼ x 4¼ in. (22.86 x 10.80 x 10.80 cm).
60-863919	Replacement 6.5 volt Battery. Est. shpg. wt. 2 oz. (56 gr).

67-1161.4 Hz Tone Generator

C The SLN-6221A Tone Generator will permit the use of the latest 4 prong miniature reeds (Model TLN-6824A series) and also the 6 prong reeds (Models TLN-6364A and TLN-6492A series). The SLN-6221A generator operates over the range of 67.0 Hz to 1161.4 Hz.

SLN-6221A	Tone Generator complete W/Batteries & Cable (less reeds). Est. shpg. wt. 1¾ lbs. (.79 kg). Est. packaged dim. 9 x 4¼ x 4¼ in. (22.86 x 10.80 x 10.80 cm).
60-863919	Replacement 6.5 volt Battery. Est. shpg. wt. 2 oz. (56 gr).

**TU-217 and TLN series "Vibrasender" reeds supplied by Motorola Component Products.*



TEK-1B

Output
Level
Off
400∿
1000∿
Tone Generator

TEK-28

TEKA-66

TEKA-18

TEKA-19

Tone Oscillators

Battery Operation

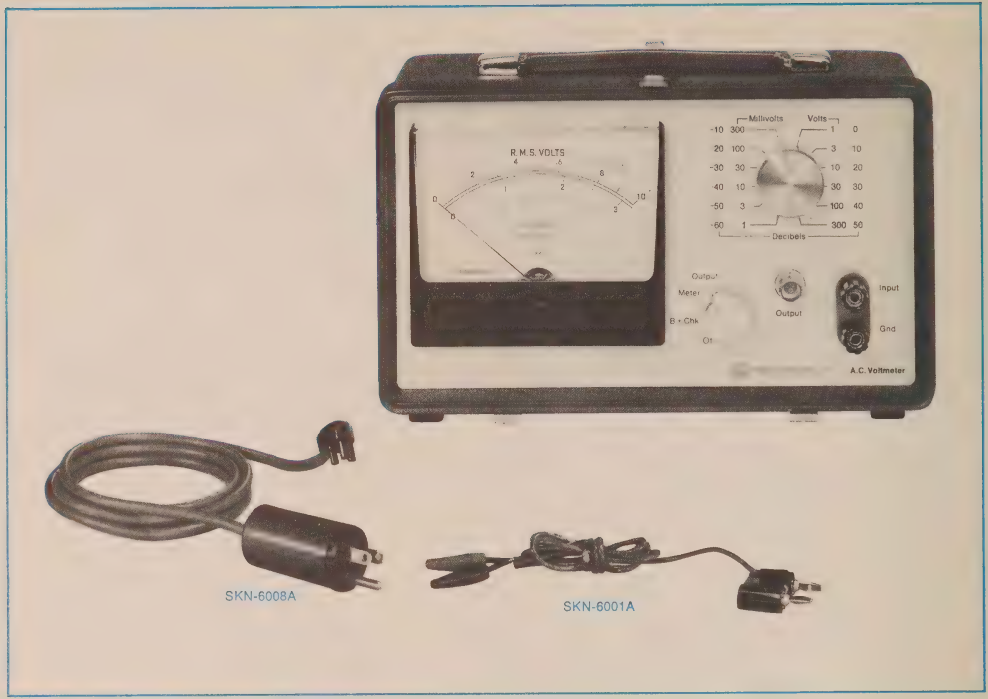
Two Frequencies (400 and 1000 Hz) for use in adjusting transmitter deviation, setting tone levels on remote control lines, and testing audio circuits. Provides one volt minimum when used to modulate transmitter audio circuits of 500 ohms or higher.

Four Models Available

TEK-1 & TEK-28 are supplied with a 3 foot cord terminated in a 4 prong microphone connector. Model TEK-31 (Not Shown) is similar to TEK-1 but has amplifier circuitry, designed to provide 1 volt into a lower impedance of 50 ohms for use with low impedance audio applications such as IMTS radio. Model TEK-31 is supplied with battery, but less mike cable.

TEK-1B	Tone Oscillator w/cable and battery. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 9 x 4½ x 4½ in (22.86 x 11.43 x 11.43 cm).
TEK-28A	Tone Oscillator w/cable and battery designed for panel mounting in either the Motorola test set or Universal control panel. Est. shpg. wt. 1½ lbs. (.68 kg). Est. packaged dim. 6 x 14¾ x 4 in. (15.24 x 37.47 x 10.16 cm).
TEK-28A/1	Same as TEK-28 above except designed for standard 19″ rack panel mounting. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 5 x 23 x 4¾ in. (12.70 x 58.42 x 12.07 cm).
TEK-31	Tone Oscillator w/battery less cable. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 9 x 4½ x 4½ in. (22.86 x 11.43 x 11.43 cm).
TEKA-66	3-circuit phone plug to 4-prong mic connector. Est. shpg. wt. 4 oz. (112 gr).
TEKA-18	Test Leads with Clips. Est. shpg. wt. 4 oz. (112 gr).
TEKA-19	Test Leads with 1 Clip and 1 Prod. Est. shpg. wt. 4 oz. (112 gr).
60-82282C01	Spare Battery, 9V for TEK-1 & TEK-28. Est. shpg. wt. 2 oz. (.56 gr).
60-82292H01	Spare Battery, 8.4 V for TEK-31. Est. shpg. wt. 2 oz. (.56 gr).

Solid-State AC Voltmeter



• All Silicon Transistors • High Input Impedance • High Sensitivity • Lightweight and Portable • Battery and Line Operated • Amplifier Output.

Laboratory Performance

Measures from 100 microvolts to 300 volts rms on 12 scale ranges. Provides dB measurements from −72 to +52 on 12 ranges. Amplifier output provides 1.4 volts peak to peak, or 0.5 volts rms into 600 ohms or more. *Taut-band indicating meter* incorporates a linear scale for more accurate readings between scale markings; excellent repeatability without meter tapping and increased electrical ruggedness for greater overload protection. For field use, the Motorola A.C. Voltmeter is supplied with a protective front cover. Clips inside cover permit convenient storage of cable kit.

Battery or AC Operation

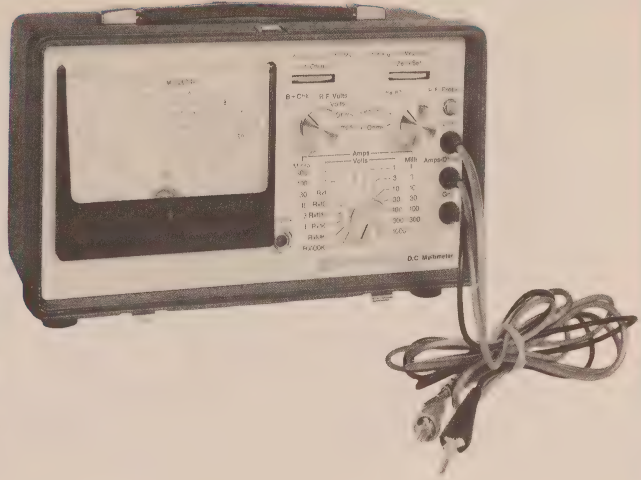
Unit may be operated from either battery power or any convenient AC source. This flexibility means that the unit operates from an AC source while in the service shop, laboratory or on the production line. Since the batteries are not in use during such applications, battery life is greatly extended. Batteries last longer, retain reserve power for portable applications and where freedom from power line interference is desirable. Even in the laboratory, its battery operation offers many advantages. The Motorola AC voltmeter can be used without a transformer when making measurements on ungrounded or symmetrical circuits. And there is no problem of hum or noise interference pick-up from AC power lines.

S-1053C	AC Voltmeter with Battery and 117V ac Power Cable. Est. shpg. wt. 8¼ lbs. (3.71 kg). Est. packaged dim. 8½ x 8¾ x 14¼ in. (21.59 x 22.23 x 36.20 cm).
SKN-6001A	Test Lead Cable Kit with dual banana plug and alligator clips. Est. shpg. wt. 1 oz. (28 gr).
60-82292H01	Spare battery, 8.4V mercury
SKN-6008A	117V ac power cable
SKN-6009A	220V ac power cable. Est. shpg. wt. 8 oz. (224 gr). Est. packaged dim. 5¾ x 3 x 2 in. (14.61 x 7.62 x 5.08 cm).

SPECIFICATIONS

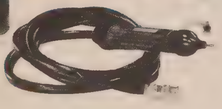
Accuracy: Within ±2% of full scale between 20 Hz and 1 MHz; ±1 dB of full scale between 5 Hz and 2.5 MHz. **Voltage Range:** 1 mv to 300 volts RMS in 12 ranges (1,3,10,30,100,300 millivolts and 1,3,10,30,100 and 300 volts full scale) plus dB scale range of −72 dB to +52 dB, referred to 1 milliwatt in 600 ohms. **Detachable Cover:** stores conveniently on back of unit. **Input Impedance:** 10 megohms shunted by 15 mmf on the 1 to 300 volt ranges; 1 megohm shunted by 30 mmf on the 1 to 300 millivolt ranges. **Overload Protection:** Protected up to 550 volts peak in "volt" ranges: up to 110 volts (A.C.) in "Millivolt" ranges. **Operating Temperature Range:** −20°C to +50°C. At +10°C and +40°C accuracy changes less than 2% within frequency range of 20 Hz to 1 MHz. **Circuit:** Fully transistorized with 7 transistors. **Batteries:** One 8.4V mercury battery. Part No. 60-82292H01. **Normal Battery Life:** Over 400 hours. **Finish:** Dark gray metallic wrinkle finish with brushed aluminum front panel.

Solid-State DC Multimeter



SKN-6008A

SLN-6083A


SLN-6055A

SKN-6009A

Here is a lightweight, portable electronic DC multimeter with laboratory precision . . . highly versatile . . . ideally suited for radio communications servicing both in the shop and in the field. Durable, solid state circuitry plus a rugged, heavy-duty aluminum housing combine to form an extremely rugged and sturdy instrument.

Taut-band meter with 4″ scale provides excellent repeatability, increased overload protection and greater linearity for improved accuracy. Control facilities include function selector, range switch, polarity reversal switch, zero set and ohms-infinity adjustment. Battery operation means there is no 60 Hz hum problem, no common ground problem. Battery life is over 600 hours.

Excellent sensitivity, high input resistance and 3% voltage accuracy are but a few of the many features designed to meet a wide variety of applications . . . both in conventional tube circuitry and transistor and printed circuit equipment.

S-1063B	DC Multimeter, Bat./117V ac ±10%, 50-300 Hz. Complete with battery and 117V ac power cable. Est. shpg. wt. 8¼ lbs. (3.71 kg). Est. packaged dim. 8½ x 8¾ x 14¼ in. (21.59 x 22.23 x 36.20 cm).
SKN-6008A	117V ac power cable
SKN-6009A	220V ac power cable. Est. shpg. wt. 8 oz. (224 gr). Est. packaged dim. 5¾ x 3 x 2 in. (14.61 x 7.62 x 5.08 cm).
SLN-6055A	Plug-in R.F. Probe. Est. shpg. wt. 4 oz. (112 gr).
SLN-6083A	Probe termination (50 ohms). Est. shpg. wt. 3 oz. (84 gr).
60-82457B01	Spare battery, 22½V
60-82458B01	Spare battery, 1½V

SPECIFICATIONS

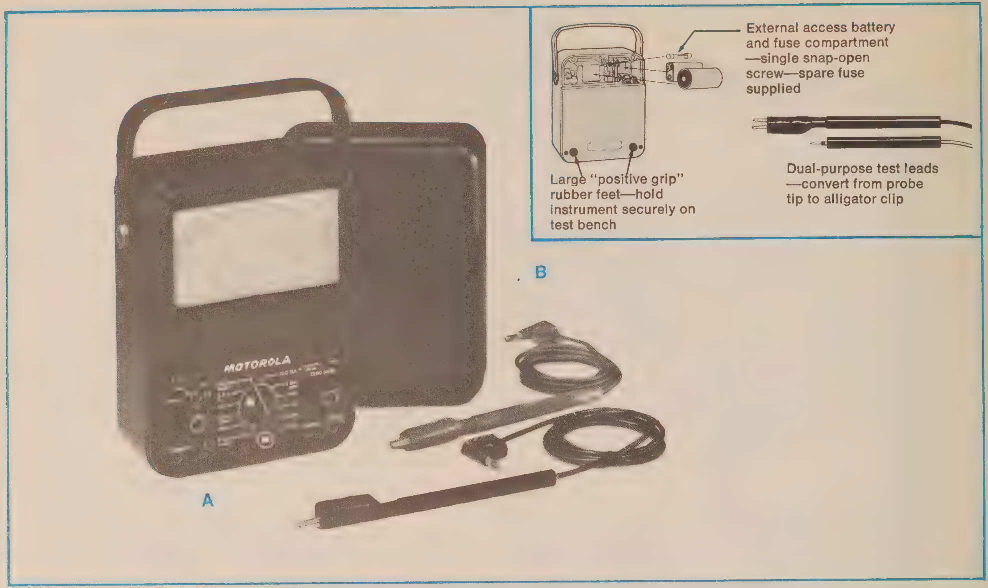
S-1063A DC Multimeter

DC Voltmeter Ranges (full scale): Millivolts—100 and 300. Volts—1, 3, 10, 30, 100, 300, and 1000. **Accuracy:** ±3% of full scale. **Input Resistance:** 11 megohms. (10 megohms on 100 mv range.) **Zero Drift:** less than 1%/°C. **DC Milliammeter Ranges (full scale):** microamperes—1, 3, 10, 30, 100 and 300. Milliamperes—1, 3, 10, 30, 100 and 300. **Accuracy:** ±5% of full scale. **Ohmmeter Ranges (center scale):** ohms—10, 100, 1000, 10,000, 100,000 and 1,000,000. Measurement range: 0.2 ohms to 50 megohms. **Accuracy:** ±5% at center scale. **Circuit:** All silicon transistor circuit. **Batteries:** 1 Burgess type 4156 (22½v) Pt. No. 60-82457B01. 1 Burgess Type 130 (1½v). Pt. No. 60-82458B01. **Size:** 10¼″ x 6½″ x 5¾″.

SPECIFICATIONS

SLN-6055A and SLN-6083A RF PROBES

Frequency Response: ±1 dB of full scale, 10 kHz to 10 MHz; ±2 dB of full scale, 10 MHz to 200 MHz. **With termination:** ±1 dB of full scale, 100 MHz to 400 MHz. **Ranges:** 0.3, 1.0, 3.0 and 10.0 volts full scale.



External access battery and fuse compartment—single snap-open screw—spare fuse supplied

Large "positive grip" rubber feet—hold instrument securely on test bench

Dual-purpose test leads—convert from probe tip to alligator clip

AC-DC VOM with Mirror or Standard Scale*

External access battery and fuse compartment . . . one standard 9-volt NEDA 1604 and one 1.5-volt "D" cell NEDA 13F. Clip-type fuse holder and extra fuse. Positive-grip rubber feet. 0-1 volt DC range. 0-500 volt AC and DC ranges. Shock-resistant, varistor-protected, precision taut-band movement. Screw-on test leads with combination probe and alligator clips.

A This dependable unit is popular with electronic technicians because of its accuracy and versatility. Highly sensitive, the unit features rugged printed circuitry, is easy to operate, readily portable, sturdily built, operates from standard flashlight batteries. Adjustable handle holds unit at the desired viewing angle. Supplied complete with test leads and batteries.

T-1009A*	AC-DC VOM (Standard Scale). Est. shpg. wt. 3¾ lbs. (1.69 kg). Est. packaged dim. 10 x 6½ x 5¼ in. (25.40 x 16.51 x 13.34 cm).
T-1010A*	AC-DC VOM (Mirror Scale). Est. shpg. wt. 3¾ lbs. (1.69 kg). Est. packaged dim. 10 x 6½ x 5¼ in. (25.40 x 16.51 x 13.34 cm).
ST-597	Carrying case for T-1009A and T-1010A.

B Made of tough, durable, vacuum formed thermoplastic, the protective cover fits over the face of your Simpson VOM snugly, firmly—with an easy snap. Protects the face of your VOM from scratches, nicks, cracks. Prevents dust and dirt accumulation and stops accidental damage to switch knobs and buttons.

ST-1084	Protective cover, snap fit for all Simpson 260 and 270 series VOM's, color black.

SPECIFICATIONS

Motorola T-1009A & T-1010A

Sensitivity: 20,000 ohms/volt DC, 5,000 ohms/volt AC. **Polarity Reversing Switch:** Makes DC measurements easier and faster . . . no lead reversal. **50 Microampere-230 Millivolt Range:** Gives more sensitive measurements . . . provides complete current coverage in six easy steps. **Popular DBM Ranges:** —20 dBm to +50 dBm, one milliwatt in 600 ohms. **Improved Frequency Response in AC Measurements:** 5 to 500,000 Hz. **Full-Wave Bridge Rectifier System:** Provides more accurate AC voltage measurements. **Frequency Response:** Essentially flat through 50,000 Hz. Size: 5¼" x 7" x 3⅛". **Batteries:** 9V NEDA 1604 and 1.5V "D" cell NEDA 13F.

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*Manufactured by Simpson Electric Company.

Voltmeters

A

R-1008A
SOLID STATE V-O-M

B

Triplett 310 Miniature Vom

A One selector switch . . . 20,000 ohms per volt DC and 5,000-volt AC sensitivity. Self-shielded for checking in strong magentic fields with unbreakable plastic window. Complete with leads, battery and instruction manual. Accuracy 3% DC, 4% AC.

T-1017A Est. shpg. wt. 1⅛ lbs. (.5 kg). Est. packaged dim. 8 x 7 x 7 in. (20.32 x 17.75 x 17.75 cm).

RTL-4039A	Replacement needle point leads.
ST-680	Carrying Case.
60-855262	Replacement Battery.
60-80333A83	Replacement Battery.

New Motorola Model R-1008A FET Vom

Exclusive New Low Power Circuitry Provides Battery Life in Excess of 1 Year with Carbon Batteries Left On Continuously.

Low Power OHMS—6 Ranges with 70 MV Power Source for In Circuit Measurements without Component Damage.

B The Model R-1008A Solid-State, Volt-Ohm-Milliameter, with LP OHMS®, offers an exceptionally wide range of measuring functions in a portable unit. It has been designed and engineered with an entirely new concept for fast in-circuit testing of electronic and electrical applications.

The Model R-1008A is designed for ease of operation with an easy-to-use push-button selection of measuring function and simplified scale with only two arcs for 28 AC/DC ranges. Coupled with a single range selector switch, you can select any of 52 ranges without confusing lead changes or other complicated set-ups.

One probe is used for all functions: DC, AC, MA and OHMS. The small, compact probe has a built in sliding switch which places an isolation resistor in series with the instrument on DC voltage readings. The Model R-1008A is frequency compensated from 50 Hz to 50 kHz. The solid-state circuit design requires no warm-up period and readings may be made immediately.

R-1008A FET VOM with LP OHMS®, complete with leads, alligator clips, batteries and instruction manual Est. shpg. wt. 4 lbs. (1.80 kg.) Est. packaged dim. 10 x 6¾ x 4½ in. (25.40 x 17.15 x 11.43 cm).

ST-1090	Carrying Case.
RTL-4035A	High Voltage Probe.
RTL-4036A	RF Probe.
RTL-4037A	Replacement test lead "positive"
RTL-4038A	Replacement test lead "common."
60-82282C01	Replacement battery (2 req'd), 9 V snap-on type.
60-82455G01	Replacement battery (1 req'd), 1½ V "D" cell.

SPECIFICATIONS

DC Volts:

Ranges: 0-0.3-1-3-10-30-100-300-1,000. **Accuracy:** ±3% of full scale all ranges. **Input resistance all ranges:** 11 megohms. 1.12 meg resistor in probe tip.

AC Volts:

Ranges: 0-0.03-0.1-0.3-1-3-10-30-100-300-1,000. **Accuracy:** ±3% of full scale all ranges. **Input Impedance all ranges:** 10 megohms. Frequency range: 20 Hz to 10 kHz.

Ohms—Lower Power:

Employs a 70 mV power source. **Ranges:** 0-1k-10k-100k-1MΩ-10MΩ-1,000MΩ. 10 Ohm center scale on low range. Maximum power applied to device under test on low range—123 Microwatts. **Accuracy:** ±3% of DC V arc on all ranges.

Ohms—Conventional:

Employs a 1½ Volt power source. **Ranges:** 0-1k 10k-100k-1MΩ-10MΩ-1,000MΩ. 10 Ohm center scale on low range. **Maximum power applied to device under test on low range:** 56 Milliwatts. **Accuracy:** ±3% of DC V arc on all ranges.

AC and DC Milliamperes:

Ranges: 0-1-10-100-1000 at 316 mV. **Accuracy:** ±4% DC, ±4% AC full scale all ranges.

Decibels:

Ranges: −30 to +62. **Accuracy:** ±3% of full scale all ranges. "O" dB is equal to .776 V.

Test Construction:

Meter: 50 μA suspension movement with approx. 4½″ scale length. **Case:** black molded high-impact plastic; with metal handle that can be used to place instrument on approx 25° angle; etched aluminum panel; dimensions 5⅛″ x 6½″ x 3³⁄₁₆″.

Batteries:

Requires: Two 9 volt (60-82282CO1) snap-on type.
One 1½ volt "D" cell (60-82455GO1).

Portable Digital Vom†

the ultimate in portability with unique analog output and indication

AC LINE OR SELF-CONTAINED BATTERY OPERATION

- **3½ digit, non-blinking, auto-polarity 0.43" LED display**
- 29 popular ranges
- Measures AC and DC current and voltage
- Measures conventional and "low-power" ohms
- Analog meter useful for nulling and peaking
- Exclusive MOS-LSI circuitry assures high stability and reliability, immunity to noise, low power drain and permits compact design.

R-1002A	Digital VOM complete with test leads, 120V AC line adapter and instruction manual (less batteries).
TEKA-87	Carrying case for R-1002A
R-1002A/220V	Digital VOM as above except has 220V line AC adapter
RTL-4009A	RF probe
RTL-4020A	Replacement test leads.
60-82750K01	Replacement battery for R-1002A (4 required). Nickel-cadmium "C" size rechargeable.
RTL-4016A	Replacement 120VAC adapter/charger
RTL-4017A	Replacement 220VAC adapter/charger

SPECIFICATIONS

MAXIMUM COMMON MODE VOLTAGE: 600V (DC plus peak AC) from "COMMON" terminal to third wire power line ground terminal.

DISPLAY: Numerical Display: 3½ digits, 7-segment, 0.33 inch high LED type, non-blinking with storage. **Conversion Rate:** 3 readings per second nominal. **Overrange Indication:** Automatic beyond 1999, with lower half of the "1" digit flashing. **DC Polarity Selection:** Automatic, with "+" or "—" indication. **Analog Display:** 50-0-50μA meter type.

ANALOG OUTPUT: Level: 1 VDC with reading of 1000. **Output Resistance:** 100 ohms, nominal. **Accuracy:** ±(accuracy of range +2% of meter F.S.)

REFERENCE CONDITIONS: Temperature: +25°C ±1°C. **Relative Humidity:** 30 to 60%. **Atmospheric Pressure:** 575 to 800 mmHg.

POWER REQUIREMENTS: AC Operation or Battery Charging: 120 VAC or 220 VAC ±10% (check rear panel designation) 50 to 400 Hz. **Battery Operation:** Four nickel-cadmium "C" size rechargeable cells (not supplied) GE Cat. No. GCT1.5SB or equivalent; each cell rated at 1.25V, 1.5 ampere-hours, order Motorola Part No. 60-82750K01 (4 required) separately. **Operation Time (continuous with fully charged battery):** 8 hours nominal. **Recharge Time (function switch in "BATT CHRG ONLY" position):** 16 hours nominal. **Recharge Time (while instrument is in operation):** 30 hours nominal.

TEMPERATURE RANGE: Operating: 0°C to +50°C. **Storage:** —40°C to +60°C.

WEIGHT (with batteries): 4.5 lbs. (nominal); **(Without batteries):** 4.0 lbs. (nominal).

DIMENSIONS: 7.2" high, 5.4" wide, 3.75" deep (not including panel controls).

DC Voltage

Range	Maximum Indication	Input Impedance	Overload Protection
200mV	199.9mV	≧ 100MΩ	350V
2V	1.999V	≧1000MΩ	350V
20V	19.99V	10MΩ	1100V
200V	199.9V	10MΩ	1100V
1000V	1110 (max. input)	10MΩ	1100V

Accuracy: (from +15°C to +35°C); ±(0.25% of reading +1 digit). **Input Bias Current:** 7 nA maximum at reference conditions. **Resolution:** 100 μV on 200mV range. **Overrange Capability:** Linear to 250 counts beyond maximum indication (except on 1000V range, where "overrange" is an overload). **Temperature Coefficient:** (from 0°C to +50°C); ±(0.025% of reading +0.1 digit)/°C. **Full Scale Step Response:** (to rated accuracy); 2 seconds (to 2,000 counts). **Normal Mode Rejection:** 35 dB minimum at Hz. **Common Mode Rejection:** 80 dB minimum at 60 Hz with 1kΩ unbalance, 1000 dB min. at DC with 1kΩ unbalance.

DC Current

Range	Maximum Indication	Full Scale Voltage	Drop Overload Protection
20μA	19.99μA	200mV	3mA
200μA	199.9μA	200mV	25mA
2mA	1.999mA	200mV	½ Amp*
20mA	19.99mA	200mV	½ Amp*
200mA	199.9mA	200mV	½ Amp*
2A	1.999A	200mV	3 Amps
10A	10.00A (max. input)	100mV	10 Amps

Accuracy: (from +15°C to +35°C); ±(0.5% of reading +1 digit) except on 2A and 10A ranges, which are ±(1.0% of reading +1 digit): **Resolution:** 10 nA on 20μA range. **Overrange Capability:** Linear to 250 counts beyond maximum indication (except on 10A range, where "overrange" is an overload). **Full Scale Step Response:** (to read accuracy); 2 seconds (to 2,000 counts). **Temperature Coefficient:** (from 0°C to +50°C); ±(0.03% of reading +.1 digit)/°C.

***Fuse Protected.**

AC Voltage

(Average-sensing, RMS-Calibration Sinewave)

Range	Maximum Indication	Input Impedance	Overload Protection
200mV	199.9mV	1MΩ and 150 pf	350V RMS
2V	1.999V	1MΩ and 150 pf	350V RMS
20V	19.99V	1MΩ and 150 pf	650V RMS
200V	199.9V	1MΩ and 150 pf	650V RMS
600V	600V (max. input)	1MΩ and 150 pf	650V RMS

Accuracy: (from +15°C to +35°C); ±(0.5% of reading +1 digit), 40 Hz to 1:0 kHz; ±(1.0% of reading +1 digit), 1.0 kHz to 10 kHz; ±(2.0% of reading +2 digits), 10 kHz to 20 kHz. **Resolution:** 100 μV on 200mV range. **Overrange Capability:** Linear to 250 counts beyond maximum indication (except on 600V range, where "overrange" is an overload). **Full Scale Step Response:** (to rated accuracy); 5 seconds (to 2,000 counts). **Temperature Coefficient:** (from 0°C to +50°C); ±(0.05% of reading +0.1 digit)/°C.

AC Current

(40Hz to 10kHz)

Range	Maximum Indication	Full Scale Voltage	Drop Overload Protection
200μA	199.9μA	200mV	25mA
2mA	1.999mA	200mV	½ Amp*
20mA	19.99mA	200mA	½ Amp*
200mA	199.9mA	200mV	½ Amp*
2A	1.999A	200mV	3 Amps
10A	10.00A (max. input)	100mV	10 Amps

Accuracy: (from +15°C to +35°C); ±(1.0% of reading +1 digit) except on 2A and 10A ranges, which are ±(2.0% of reading +2 digits). **Resolution:** 100 nA on 200μA range. **Overrange Capability:** Linear to 250 counts beyond maximum indication (except on 10A range, where "overrange" is an overload). **Full Scale Step Response:** (to rated accuracy); 5 seconds (to 2,000 counts). **Temperature Coefficient:** (from 0°C to +50°C); ±(0.05% of reading +.1 digit)/°C.

***Fuse Protected.**

Resistance

Range	Maximum Indication	Test Current	Full Scale Voltage	Max. Open-Circuit Voltage	Overload Protection
200Ω*	199.9Ω	420μA	100mV	150mV	250V RMS
2kΩ*	1.999kΩ	42μA	100mV	150mV	250V RMS
20kΩ	19.99kΩ	10μA	200mV	10V	250V RMS
200kΩ	199.9kΩ	10μA	2V	10V	250V RMS
2MΩ	1.999MΩ	1μA	2V	10V	250V RMS
20MΩ	19.99MΩ	100nA	2V	10V	250V RMS

Accuracy: (from +15°C to +35°C), ±(0.5% of reading +1 digit), on all ranges except (1% + 2 digits) on 20MΩ ranges and 2MΩ ranges. **Resolution** : 0.1 ohm on 200Ω range. **Overrange Capability:** Linear to 250 counts beyond maximum indication, except on 200Ω and 2k ranges. **Temperature Coefficient:** (from 0°C to +50°C); ±(.05% of reading +.1 digit)/°C. **Full Scale Step Response:** (to rated accuracy); 2 seconds (to 2,000 counts), except on the 20MΩ range, which is 6 seconds.

***Low Power Ohms:** 1. Maximum Open Circuit Voltage = 150mV; 2. Maximum Power Dissipated in Unknown = 100μW.

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†Manufactured by Simpson Electric Company

Digital Multimeter[†]

Dual-purpose handle has knurled set knobs and also acts as tilt-stand base.

Completely Portable

No separate battery pack or power supply needed. Operates up to 8 hours on 4 nickel-cadmium, rechargeable D cell batteries. When plugged in to the AC line the batteries recharge automatically. No fear of blow-up or ruining of batteries.

Non-Blinking 3½ Digit Display

Instant readout, no warm-up time required. Numerals are formed by positive seven-segment build-up permitting more constant illumination. Automatic + or — and overrange indication.

28 Switch-Selected Ranges

5 AC and DC voltages . . . 5 AC and DC currents . . . and 6 resistances . . . with accuracy from ±0.5% of reading, ±1 digit.

The unit combines the advantages of high accuracy, multiple range testing with non-blinking digital numerical display. It is ideal for all-day field assignments or laboratory situations where line power is not available or where line interference is to be avoided.

R-1001A	Digital multimeter complete with instruction manual (less batteries). Est. shpg. wt. 4½ lbs.
RTL-4009A	RF probe
RTL-4020A	Replacement test leads.
60-82750K02	Replacement battery for R-1001A (4 required). Nickel-cadmium "D" size rechargeable.

SPECIFICATIONS

Accuracy % of reading: +15°C to 35°C. **DC Voltage:** ±(0.1% of reading + 1 digit). **AC Voltage:** ±(0.5% of reading + 2 digits) 40 Hz — 1 kHz; ±(1.0% of reading + 2 digits) 1 kHz — 10 kHz. **DC Current:** ±(0.5% of reading + 1 digit), except ±(1.0% of reading + 1 digit) on 2000 mA and 10 A ranges. **AC Current:** ±(1.5% of reading + 2 digits), except ±(2.0% of reading + 2 digits) on 2000 mA and 10 A ranges. **Resistance:** ±(0.5% of reading + 1 digit) except ±(1.0% of reading + 1 digit) on 20 MΩ ranges. **RESOLUTION:** AC/DC voltage 100 μV, DC Current 100 nA, AC Current 100 nA, Resistance 0.1 Ω. **Normal Mode Rejection:** 55 dB min. at 60 Hz. **Common Mode Rejection:** 90 dB min. at 60 Hz. **Numerical Display:** 3½ digits, 7 segment, 0.43″ LED, non-blinking with storage. **Conversion Rate:** 3 per second. **Overrange Indication:** Flashing digits beyond 1999 counts. **DC Polarity:** Automatic "+" or "—". **Rated Circuit-to-Ground Voltage:** (Maximum Common Mode Voltage): 1000 volts (DC plus peak AC) maximum from any measuring terminal to power line (earth) ground terminal. **Power Requirement:** AC Operating or Battery Charging: 120 VAC or 220 VAC ±10% (check rear panel designation) 50-400 Hz, 5 VA nominal. Battery Operation: Four nickel-cadmium "D" size rechargeable cells. Eveready type CH4 or equivalent (each cell is rated at 1.25 V. 4-ampere-hours). Motorola Part Number 60-82750K02. Battery Operation Time (Continuous with fully charged battery): 8 hours nominal. Battery Recharge Time: 16 hours, nominal. **Temperature Range:** Operating: 0°C to +55°C. Storage: —40° to +60°C. **Dimensions:** Height: 2.70 in. (68.6 mm). Width: 8.40 in. (213.4 mm). Depth: 9.00 in. (228.6 mm). **Weight:** Approximately 3 lbs. (1.36 kg) without batteries.

RTL-4009A R.F. Probe

The R.F. Probe is designed to measure voltages at frequencies above the range of the regular test probe furnished with the R-1001A and R-1002A. The probe consists of a probe body, a 4 foot length of coaxial cable, a dual-banana connector, and a ground lead which screws into the probe body and is terminated in an alligator clip.

SPECIFICATIONS

Frequency Response: 10 KHZ to 250 MHZ within ±1 dB. **Probe Input Capacity:** 2.0 Pico-Farads. **Voltage Range:** 40 Volts RMS (Maximum). **Probe Accuracy:** ±3% of Full Scale on Voltage Ranges; 2 Volts F.S. and higher at mid-frequencies. **Maximum D.C. Input:** 400 Volts. **Rated Circuit-to-Ground Voltages:** 500 Volts Peak.

RANGES—
DC VOLTAGE:

Range	Maximum Indication	Input Resistance	Overload Protected to
200 mV	±199.9 mV	10 MΩ	±1100 V
2 V	±1.999 V	10 MΩ	±1100 V
20 V	±19.99 V	10 MΩ	±1100 V
200 V	±199.9 V	10 MΩ	±1100 V
1000 V	±1000 V (Max. Input)	10 MΩ	±1100 V

AC VOLTAGE: (Average-Sensing, RMS Calibrated Sine Wave 40 Hz to 10 kHz)

Range	Maximum Indication	Input Impedance	Overload Protected To
200 mV	199.9 mV	10 MΩ at 75 pF	650 V RMS
2 V	1.999 V	10 MΩ at 75 pF	650 V RMS
20 V	19.99 V	10 MΩ at 75 pF	650 V RMS
200 V	199.9 V	10 MΩ at 75 pF	650 V RMS
600 V*	600 V (Max. Input)	10 MΩ at 75 pF	650 V RMS

*Frequency Range: 40 Hz to 1000 Hz.

RESISTANCE:

Range	Maximum Indication	Test Current	Overload Protected To
200 Ω	199.9 Ω	1 mA	135 V RMS
2 kΩ	1.999 kΩ	1 mA	135 V RMS
20 kΩ	19.99 kΩ	100 uA	250 V RMS
200 kΩ	199.9 kΩ	1 uA	250 V RMS
2000 kΩ	1999 kΩ	1 uA	250 V RMS
20 MΩ	19.99 MΩ	100 nA	250 V RMS

DC AMPS:

Range	Maximum Indication	Full Range Voltage Drop	Overload Protected To
200 uA	±199.9 uA	200 mV	±2.5 A*
2 mA	±1.999 mA	200 mV	±2.5 A*
20 mA	±19.99 mA	200 mV	±2.5 A*
200 mA	±199.9 mA	200 mV	±2.5 A*
2000 mA	±1999 mA	200 mV	±2.5 A*
10 A	±10.00 A (Max. Input)	100 mV	±10 A

*Fuse Protected.

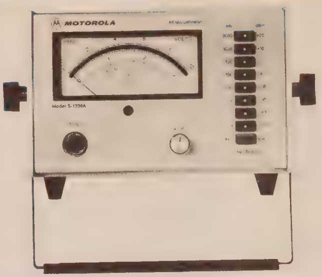
AC AMPS:

Range	Maximum Indication	Full Range Voltage Drop	Overload Protected To
200 uA	199.9 uA	200 mV	2.5 A*
2 mA	1.999 mA	200 mV	2.5 A*
20 mA	19.99 mA	200 mV	2.5 A*
200 mA	199.9 mA	200 mV	2.5 A*
2000 mA	1999 mA	200 mV	2.5 A*
10 A	10.00 A (Max. Input)	100 mV	10 A

*Fuse Protected.

[†] Manufactured by Simpson Electric Company

Solid State RF Millivoltmeters

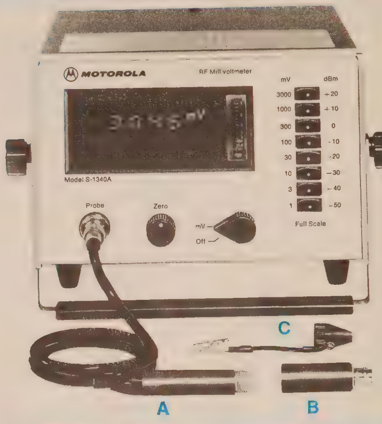


Optional Accessories Necessary for frequencies above 600 MHz.

TEE ADAPTER
MODEL 91-14A
BOONTON ELECTRONICS

RTL-4000A N Tee Adapter

RTL-4001A
50 ohm Termination Load



• Measures RF voltages from 100 µv to 3 V. • Accurate measurements over the frequency range of 10 KHz to 1.2 GHz, usable to 8 GHz. • Analog or Digital Display. • High Impedance Probe or 50 ohm Termination.

The Model S-1339A Analog and S-1340A Digital RF Millivoltmeters provide highly accurate voltage measurements of very low RF levels at FM two-way radio communications frequencies. These instruments greatly facilitate the servicing of sophisticated solid-state communications equipment, as in making stage gain measurements, and are essential in metering the test points in the Motorola Pageboy II Radio Pager where a 1 millivolt range is required.

High reliability, long intervals between calibrations, plug-in PC boards for ease of servicing, lightweight, little heat and no warm-up delay are characteristics of the solid state design. Instruments are programmable with linear dc output. The RF probe is supplied with a probe tip and a terminated 50 ohm BNC adapter as standard equipment.

The large mirrored-scale panel-meter on the S-1339A analog unit has linear 0-3 and 0-10 voltage scales finely divided for precise readings. A dBm scale referred to 1 mW in 50 ohm is standard. Range push buttons are marked in mV and dBm to correspond with the meter scales.

The S-1340A digital model has a 4-digit display, blanked for 5% over range and below 20% full scale, with full scale counts of 3,000 and 1,000. It employs LED's (light emitting diodes) for bright, easy-to-read characters.

Manufactured by Boonton Electronics Corp.

An unusual feature allows the zero to be quickly and easily adjusted using the vertical edge-meter to the right of the display. The meter is calibrated in dBm, 50 ohm and is essential for peaking and nulling.

Wide Frequency Range

The calibrated frequency-range of all versions extends from a low 10 kHz to 1.2 GHz with uncalibrated response to beyond 8 GHz. Relative accuracy above 1.2 GHz is typically ±0.5 dB.

A 50 ohm terminated BNC adapter is supplied as standard for 50 ohm voltage measurements up to 600 MHz.

Measurements from Microvolts To 3 Volts

Eight ranges from 1 mV full scale to 3V full scale are arranged in 1-3-10 sequence. No attenuator attachments are required for measurements up to 3V.

True RMS Response

All models provide true rms response for signal inputs below approximately 30 mV.

Low Noise

Extensive care is taken throughout the design and construction to hold noise from all sources to a minimum.

S-1339A	Analog RF millivoltmeter. Est. shpg. wt. 10 lbs. (4.6 kg.)
S-1340A	Digital RF millivoltmeter. Est. shpg. wt. 11.5 lbs. (5.2 kg.)
RTL-4040A	High voltage probe.
RTL-4000A	N Tee adaptor for use above 600 MHz.
RTL-4001A	50 Ohm termination for use above 600 MHz.

(A)	**1-83554F64**	R.F. Probe with cable and connector.
(B)	**1-83554F66**	50 ohm BNC adapter.
(C)	**1-83554F65**	Probe tip with grounding clip lead.

SPECIFICATIONS

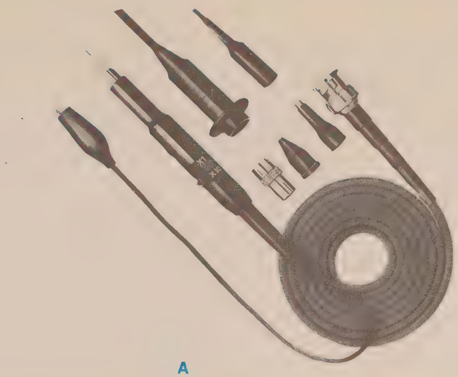
Analog Readout (Model S-1339A)

Voltage Range: 100µV to 3V. **Full Scale:** *Voltage Ranges:* 1, 3, 10, 30, 100, 1,000 and 3,000 mV. *dBm Range:* −60 to +23 dBm. ***Frequency Range:*** 10 kHz to 600 MHz (with Standard Probe) 600 MHz to 1.2 GHz (with tee adapter and 50 OHM Termination) uncalibrated response to approx. 8 GHz. **Accuracy:** Basically ± (1% rdg. + 1% f.s.) **VSWR:** Less than 1.5 to 1.2 GHz (Return Loss greater than 23 dB). **Power Sensitivity:** 200 pW, minimum detectable power in 50Ω. **RFI:** There is no detectable radiated or conducted leakage from instrument or probe. **Meter:** 4½ inch taut band, response time <1s for fs: *Two linear voltage scales:* 0 to 3; 0.05 per division, 0 to 10; 0.1 per division, *One logarithmic dBm scale:* −10 to +3; 0.2 per division max. **Temperature:** In accordance with ANSI (ASA) Spec. 39.7, 0 error from ref. 21° C. to 25° C. **Response Time:** Full scale input step function response time: less than 100 ms at dc output on 30 mV fs to 3V fs ranges increasing to 1 s. on the 1 mV fs range. **Power:** 115 or 230V ± 10%, 50 to 400 Hz, 8W. **Dimensions:** 5.2″ H (without (feet), 8.3″ W (½ module) 11.7″ D (132 x 211 x 293 mm). **Weight:** Net 7.5 lbs. (3.4 kg) (with standard accessories). **Accessories Furnished:** RF Probe, Probe Tip, 50Ω BNC Adapter.

Digital Readout (Model S-1340A)

Voltage Range: 200µV to 3V. **Display:** LED, 4 digits, full scale counts of 3,000 and 1,000. Display blanked for 5% overrange and below 20% fs. Vertically-mounted edgemeter is calibrated in dBm, 50Ω, with accuracy not specified. **Display period:** 200 ms. **Encode period:** 75 ms. **Power:** 115 or 230V 10%, 50 to 400 Hz, 10W. **Weight:** Net 9 lbs. (4.1 kg) (with standard accessories). All other specifications are the same as Model S-1339A.

Oscilloscope Probes



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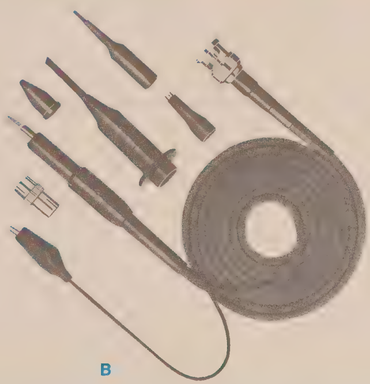


B

x1-x10 Oscilloscope Probe Kit—Fig. A

SPECIFICATIONS

Position x1
Bandwidth: D.C. to 20 MHz. **Input resistance:** 1 MΩ (oscilloscope input). **Input capacity:** 40 pF. Plus oscilloscope capacity. **Working voltage:** 500 Volts D.C. (including Peak A.C.)

Position x10
Bandwidth: D.C. to 150 MHz. **Risetime:** 4.0 nanoseconds. **Input resistance:** 10 MΩ ±2% when used with oscilloscopes with a 1 MΩ input. **Input capacity:** 10.8 pF when used with oscilloscopes which have a 28 pF input capacity. **Compensation range:** 15–50 pF. **Working voltage:** 500 Volts D.C. (including Peak A.C.)

RTL-4013A probe kit

Oscilloscope Probe Kit x1—Fig. B

SPECIFICATIONS

Bandwith: D.C. to 20 MHz. **Input resistance:** 1 MΩ (oscilloscope input). **Input capacity:** 40 pF plus oscilloscope capacity. **Working voltage:** 500 volts D.C. (including Peak A.C.) **Cable length:** 1.5 Meters.

RTL-4011A probe kit

Oscilloscope Probe Kit x10

SPECIFICATIONS

Bandwidth: D.C. to 80 MHz. **Risetime:** Less than 4 nanoseconds. **Input resistance:** 10 MΩ ±2% when used with oscilloscope with a 1 MΩ input. **Input capacity:** 10.8 pF when used with oscilloscopes which have a 28 pF input capacity. **Compensation range:** 15–50 pF. **Working voltage:** 500 Volts D.C. (including Peak A.C.). **Cable Length:** 1.5 Meters.

RTL-4012A probe kit

Dual Trace Oscilloscope

15 MHz DUAL TRACE
OSCILLOSCOPE
CHANNEL A
CHANNEL B
TRIGGER

FEATURES

- Dual Trace 15 MHz Triggered Sweep Scope
- 20 Calibrated Sweep Rates from 40 nsec/cm to .5 sec/cm. (With X5 Sweep Magnifier)
- Calibrated Deflection Factors Ranging From 5 mV/cm to 10 V/cm
- Auto and External Triggering Capability
- Front Panel X-Y Inputs for Phase Shift Measurement
- Algebraic Single Trace Sum and Difference Displays
- Automatic Selection of Alernate or Chop Mode
- Built-In Voltage Calibrator
- Modular Construction for Ease of Maintenance

The Motorola Model R-1004A (R-1003A outside U.S.A.) dual channel, 15 MHz (usable through 27 MHz) oscilloscope is a high quality instrument with features ordinarily found only in laboratory models. This oscilloscope has the performance necessary for a wide variety of applications. Features include a large viewing screen, 5% vertical attentuator accuracy, 5% horizontal accuracy and dc coupling.

EASY OPERATION

The human engineered front panel with functionally grouped controls makes measurements easier and faster. Inputs are protected to 500V, reducing chances of accidental electrical damage. Automatic triggering assures that a base-line is present even in the absence of a signal or if the trigger level control is set beyond the range of the trigger signal. And, although the Model R-1004A operates in either a chopped or alternate mode, the operator need not concern himself with making a choice since the Time/Div switch automatically selects the best display mode.

The basic stability of the solid-state circuits and components used throughout is such that internal adjustments have been eliminated. Two simple external adjustments are all that remains. This minimizes calibration requirements and provides real savings over the oscilloscope's lifetime. Recalibration, when necessary, is simple and straightforward compared to most other oscilloscopes.

TRIGGERING

Even though the instrument is easy to operate, this oscilloscope has the flexibility for multi-purpose use. The operator can select the source of sweep trigger (CHA, CHB or external) and the trigger slope, adding to the oscilloscope's versatility by allowing triggering on either the positive or negative going transitions of the signal. Further flexibility is added by the ability to preset the signal amplitude required to trigger the sweep, assuring that perturbations below the desired amplitude will not trigger the oscilloscope.

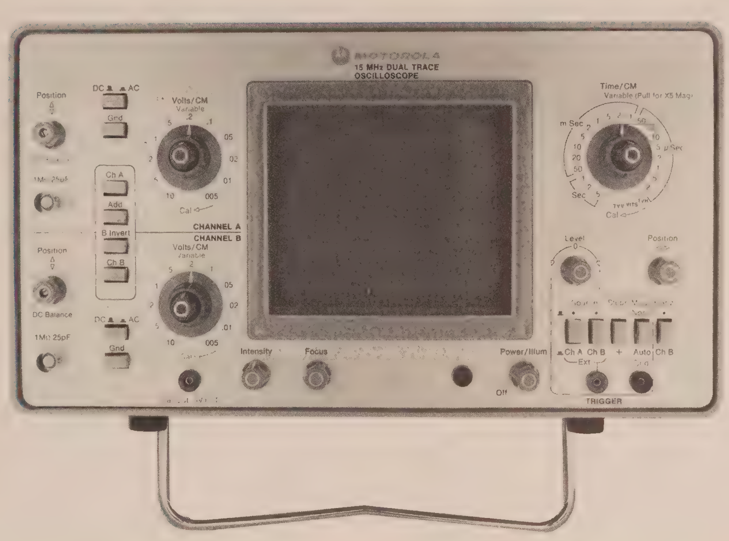
With triggered sweep, displays are stable because the observed signal itself determines when a sweep should start. Automatic triggering produces a free running trace in the absence of a signal for fast set-up. It locks onto any input signal of the proper polarity and amplitude.

X-Y INPUTS

Phase shift measurements through the vertical amplifiers permit maximum measurement flexibility with the wide selection of deflection factors. External signals can be applied to the horizontal deflection amplifiers. This capability permits X-Y plots or Lissajous figures.

CCTV SERVICING

The Model R-1004A can easily be used



to analyze composite TV waveforms, especially those waveforms encountered in video and chroma processing circuits. TVH, TVV, and VITS (Vertical Internal Test Signal) sweep rates are provided, and the horizontal or vertical line or line blanking rate signal from a TV stage can be used for external triggering. Also, the line sweep of an external TV sweep generator may be connected to the external horizontal input to observe the response characteristics of an IF amplifier connected to the vertical input of channel A.

RUGGED LIGHTWEIGHT DESIGN

This oscilloscope is (except for the CRT) constructed entirely of solid-state components, resulting in low power consumption. The consequent low heat has made possible a rugged, lightweight, closed cabinet that is resistant to shock, dust, and moisture. A convenient top handle makes carrying easy. This allows the oscilloscope to be used in rugged applications. These applications include production lines, communications servicing, process control equipment, automotive, aircraft and marine electronics.

PROBES

Motorola recommends the RTL-4011A, RTL-4012A, and RTL-4013A general purpose scope probes which are totally compatible with the R-10004A.

R-1004A	Oscilloscope (Domestic only)
R-1003A	Oscilloscope (for use outside of U.S.A.)
RTL-4011A	x1 Probe Kit
RTL-4012A	x10 Probe Kit
RTL-4013A	x1, x10 Probe Kit

SPECIFICATIONS

Model R-1004A/R-1003A Technical Data

Power Requirements: AC Voltage: 120 V ac, 220V ac or 240V ac (±10%). **Frequency:** 50 to 60 Hz. **Average Power Consumption:** 45 VA. **Fuse Ratings:** 2 Ampere, 125V 3AG Slow-Blow fuse for 120 volt operation.

Vertical Amplifier: (Channel A and Channel B). **Bandwidth, at −3 dB. DC:** DC to 15 MHz. **AC:** 2 Hz to 15 MHz. **Input Impedance:** 1M Ohm shunted by 25 pF. **Maximum Input Voltage:** 500V (dc + ac peak). **Deflection Sensitivity:** 5m V/cm to 10 V/cm calibrated in 1-2-5 sequence in eleven steps; accuracy within ±5% of full screen deflection; uncalibrated continuous control between steps. **Distortion:** No apparent degradation of input waveform at 1 kHz. **Risetime:** 24 nanoseconds. **Overshoot:** 5% or less. **Display Modes:** Channel A only, Channel B only, Channel A and B, automatically chopped at 1 msec/cm and slower sweep speeds, and automatically alternated for all faster sweep times. **Add:** Algebraic sum of Channel A and B signals. **Channel B. Invert:** Inverting of Channel B and algebraic difference of Channel A and B signal. **Chop Frequency:** 200 kHz.

Horizontal Amplifier: (Input through Channel B). **Bandwidth, at −3 dB. DC:** DC to 1.5 MHz. **AC:** 2 Hz to 1.5 MHz. **Input Impedance:** 1M Ohm shunted by 25 pF. **Maximum Input Voltage:** 500 V (dc + ac peak). **Deflection Sensitivity:** 5 mV/cm to 10 V/cm calibrated in 1-2-5 sequence in eleven steps; accuracy within ±5% of full screen deflection; uncalibrated continuous control between steps.

Calibration Voltage: .5V p-p ±1%, square wave −1 kHz.

Horizontal Sweep Ranges: Time/cm (20 Ranges): .2 usec/cm to 15 sec/cm (±5%) calibrated to 1-2-5 sequence in 20 steps; uncalibrated continuous control between steps. **TV-H:** 12.7 usec/cm. **TV-V:** 3.33 msec/cm. **Vertical Internal Test Signal:** .1 msec/cm. **Horizontal Linearity:** ±5% referenced at center of CRT. **Magnifier:** X5 Expands the fastest sweep speed from .2 us/cm to 40 nsec/cm.

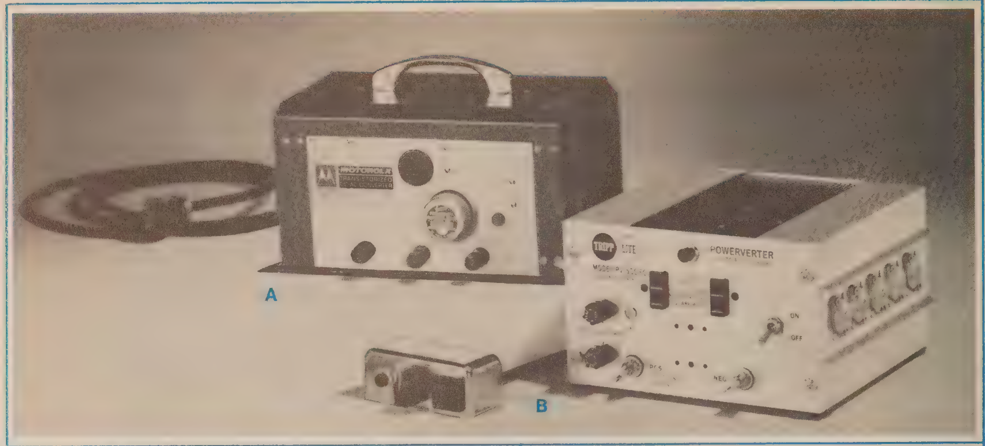
Triggering: Source: External, CH.A, CH.B. **Mode:** Normal, and Automatic. **Coupling:** ac. **Slope:** Positive and Negative. **Trigger Sources and Sensitivities:** Internal (CH.A or CH.B). .5 cm p-p of deflection for signal frequencies 10 Hz to 10 MHz, 1 cm p-p of deflection for signal frequencies 2 Hz to 15 MHz. **Auto:** .5 cm p-p of deflection for signal frequencies from 50 Hz to 10 MHz. **External:** .5V p-p for signal frequencies from 2 Hz to 15 MHz. **TV Sync:** .5 cm p-p of deflection.

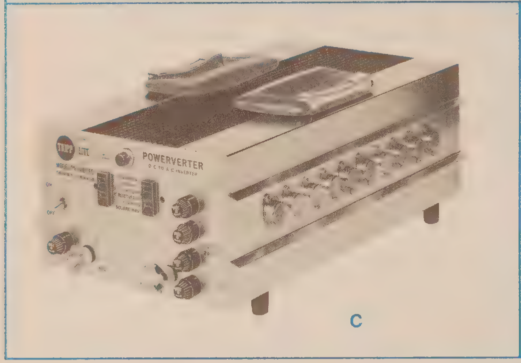
Size and Weight: Size: 6½″ H x 12″ W x 16″ D. **Weight:** 20 lbs. approx.

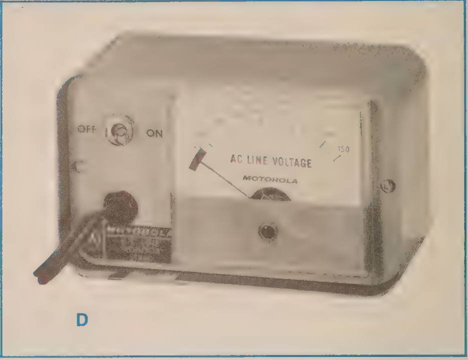
CRT: Type: 130 BHB31. **Screen Size:** 5″ flat face. **Display Area:** 8 x 10 cm. **Screen Phosphor:** P31, blue filter.

Environment: Operating Temperature: 0° to 45°C. **Vibration Spec:** EIA spec RS152B.

Frequency-Controlled DC To AC Inverters







Ideal for the service vehicle or wherever a convenient source of 115V ac is not available. Keep test equipment at operating temperature while vehicle is en route between calls, thus retaining constant stability. Operating from 12V dc, the units are fully transistorized for maximum efficiency. In addition to service vehicle use, inverters can also be used to operate power tools, soldering irons, extension lights, radios, electric razors and other small electrical appliances.

275 Watt Inverter

A T-1016A is rated at 275 watts at 115V ac, 60 cycles (300 watts intermittent), is frequency controlled to within ±1 cycle, provides protection against accidental reverse polarity connection and has a built-in cooling fan. The unit is supplied with a remote control head consisting of a rotary switch (for setting voltage at various loads), voltage indicator light and AC outlet receptacle while the converter is placed out of the way through use of the 12 ft. cable supplied with the unit.

T-1016A 275 watts dc to ac frequency-controlled inverter complete with control unit and 12-foot cable. Est. shpg. wt. 30 lbs. (13.50 kg). Est. packaged dim. 15 x 8 x 13 in. (38.10 x 20.32 x 33.02 cm).

500 Watt Inverter

B T-1041A is rated at 500 watts continuous, 550 watts max. (5 min.), 4½ amps no load. Unit is frequency controlled and features polarity protection and an overload pilot light.

T-1041A 500 watt dc to ac frequency-controlled Tripp-Lite, square wave inverter. Est. shpg. wt. 19 lbs. (8.55 kg). Est. packaged dim. 10¾ x 10¾ x 6¾ in. (27.31 x 27.31 x 17.15 cm).

1000 Watt Inverter

C T-1049A is rated at 1000 watts continuous, 1100 watts max. (5 min.), 12 amps no load. Unit is frequency controlled and features polarity protection and an overload pilot light.

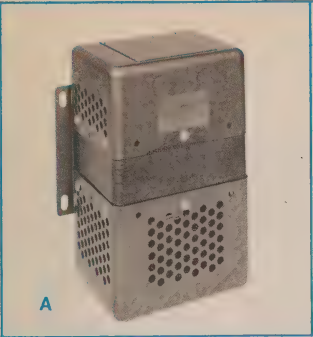
T-1049A 1000 watt dc to ac frequency-controlled Tripp-Lite, square wave inverter.

A-C Line Monitor

D The ST-860 is an expanded scale AC Voltmeter with 117V ac approximately center scale. The unit is equipped with an on-off switch and line cord. It is ideal for use where the line voltage varies or is questionable.

ST-860 AC Line Monitor. Est. shpg. wt. 1 lb. (.45 kg). Est. packaged dim. 6 x 7¼ x 4 in. (15.24 x 18.42 x 10.16 cm).

Transformers



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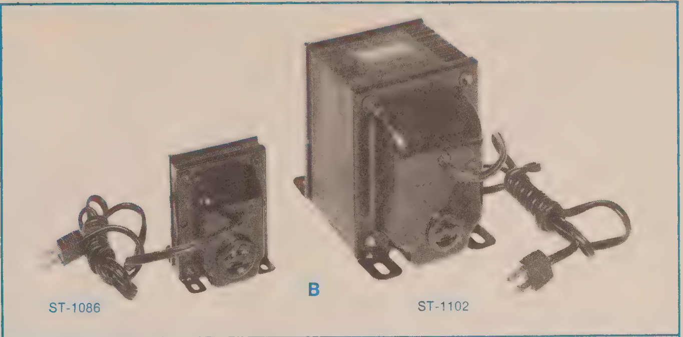

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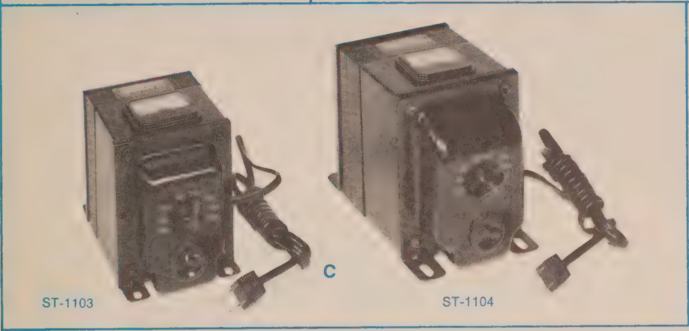

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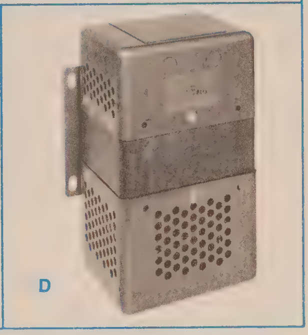


D

Sola Constant Voltage Transformers

A Guard against excessive or low line voltage problems and maintain top performance in base station equipment with Sola Constant Voltage Transformers. These static-magnetic voltage regulators are designed to provide a stabilized output voltage even though the input voltage varies over a considerable range. 60 Hz, single phase.

MODEL NO.	INPUT RANGE VOLTS	VA	SHIP. WT.	DIM.
ST-948	95-130, 190-260	500	47 lbs. (21.15 kg).	21 x 11½ x 8½ in. (53.34 x 29.21 x 21.59 cm).
ST-949	95-130, 175-235, 190-260)	1000	77 lbs. (34.65 kg).	15½ x 11¼ x 8 in. (39.37 x 28.58 x 20.32 cm).
ST-950	95-130 175-235, 190-260	2000	128 lbs. (57.60 kg).	25¼ x 13½ x 11½ in. (64.14 x 34.29 x 29.21 cm).

Step-Down Transformers

Auto Transformers Step Down Ratio 2:1 with no Voltage Regulation.

B These transformers are for operation with nominal line voltages between 220-250V ac at 50/60 Hz . . . ideal for 234V ac applications. However, usage in 220V ac applications results in 110V ac output which may result in degradations to performance specifications. Where low voltage fluctuations are encountered order either adjustable or constant voltage step down transformer below.

MODEL	VOLT AMPS	WEIGHT	DIM.
ST-1086	120	3 lbs. (1.35 kg).	4 x 6 x 4½ in. (10.16 x 15.24 x 11.43 cm).
ST-1100	500	—	—
ST-1101	750	11⅛ lbs. (5.01 kg).	6 x 4½ x 4¼ in. (15.24 x 11.43 x 10.80 cm).
ST-1102	2000	—	—

Step Down Transformer (2:1) with Manually Controlled Voltage Regulation.

C Designed for a nominal 115V ac output, these transformers feature a stepping switch for easy line voltage adjustment, built-in meter (output continuously monitored with red lines at 115V) and simple installation (receptacle and line cord with plug). Input range: 145-160-175-190-210-225-245V ac, 50/60 Hz. Output: 115V ac, 50/60 Hz.

MODEL	VOLT AMPS	WEIGHT	DIM.
ST-1103	500	9¼ lbs. (4.16 kg).	8½ x 6½ x 5¼ in. (21.59 x 16.51 x 13.34 cm).
ST-1104	1000	16¾ lbs. (7.54 kg).	9 x 6¼ x 5¼ in. (22.86 x 15.88 x 13.34 cm).
ST-1105	1500	24½ lbs. (11.03 kg).	12 x 6 x 5½ in. (30.48 x 15.24 x 13.97 cm).

Step Down (2:1) Constant Voltage Transformers.

D Static-magnetic voltage regulators provide a stabilized output voltage even though the input voltage varies over a considerable range . . . 50 Hz single phase.

MODEL	INPUT RANGE	VOLT AMPS	WEIGHT
ST-1106	95-130, 190-260	500	55 lbs.
ST-1107	95-130, 175-235, 190-260	1000	80 lbs.
ST-1108	95-130, 175-235, 190-260	2000	183 lbs.

Power Supplies

Low-Power, Power Supply

Constant Voltage/Current Limited

- **Adjustable in standby mode from 0 Vdc at 0 amps to 20 Vdc at 5 amps.**
- **Two rugged taut band meters . . . voltage and current.**
- **Automatic short circuit protection.**
- **RFI/EMI shielding inhibits radiation from affecting operation.**
- **Remote sensing . . . at load or at output jack.**
- **Factory or field installed program option.**

A This power supply, designed and manufactured by Motorola, is a virtual "must" for servicing portable radios or pagers drawing five amps or less. The unit features an extremely low ripple output for servicing even the most sophisticated solid-state equipment; excellent voltage regulation from no load, "receiver on" to full load, "full transmit" conditions; and current limiting to help prevent damage to equipment being serviced. Remote sensing capability at the load compensates for lead losses and insures that the correct operating voltage is applied to the radio being serviced.

A wide selection of voltage and current limiting ranges enhance the versatility and utility of this power supply. Ranges are especially designed to meet the needs of the two-way radio service shop. The two volt range, for example, is especially designed for servicing low level pagers and can be read and set precisely to 1.25 volts as required for particular pager models.

A factory or field installed programmable voltage option provides additional servicing speed and efficiency with this unique instrument. With this option programmed push buttons allow you to select one of three programmed voltages (as set by rear panel controls), as well as, retaining the front panel adjustable feature in the "pot adj" mode.

S-1347B	Low-power, power supply less programmable voltage option
S-1348B	Low-power, power supply with programmable voltage option

SPECIFICATIONS

S-1347B & S-1348B power supplies

Type: Series Pass Transistor Regulated. **DC Output:** Three Ranges; 0-2, 0-10, 0-20. **Current Output:** Four Ranges; 0-100ma, 0-500ma 0-1 amp, 0-5 amp. **Load Voltage Regulation:** 0.03% or 2 mv for zero to full load change. **Load Current Regulation:** 0.04% or 2 ma. **Line Voltage Regulation:** 0.03% or 2 mv for 10% change in line voltage. **Ripple & Noise:** less than 30 mvpp at any line voltage and load. **Input Power:** 105-130 vac, 210-240 vac, 50-60 Hz 200 watts. **Operating Temp Range:** 0°C-50°C. **Storage Temp Range:** −40°C-+75°C. **General:** Rear panel fuse and 3 wire ac power cable. 11½ w x 6¾ h x 12½ d wt. 26 lbs.

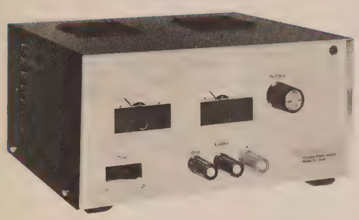
High-Current Power Supply

- **High Current capability (30 amp continuous, 40 amp intermittent)**
- **Adjustable current limiting**
- **RFI/EMI protected**
- **Input/output overvoltage protection**
- **Internal thermal protection circuits prevent damage under sustained overload operation**
- **High efficiency design permits operation from a standard 15 amp, 117 VAC line.**

B The R-1011AA Power Supply provides a well filtered, voltage regulated and current limited DC power source for servicing all types of two-way radio equipment. It provides high current capability with a 600 watt continuous rating. RFI/EMI protection is built-in to make the unit highly resistant to RF radiation from transmitters under test.

High reliability typical of Motorola designed products has been designed in. Input and output overvoltage protection as well as output short circuit protection circuits are built in for high reliability. Thermal sensors protect the unit against sustained overload conditions thus allowing maximum utilization of the intermittent 40 amp capability.

The supply is a high efficiency switching regulator type which permits operation from a standard 15 amp, 117 VAC power source.



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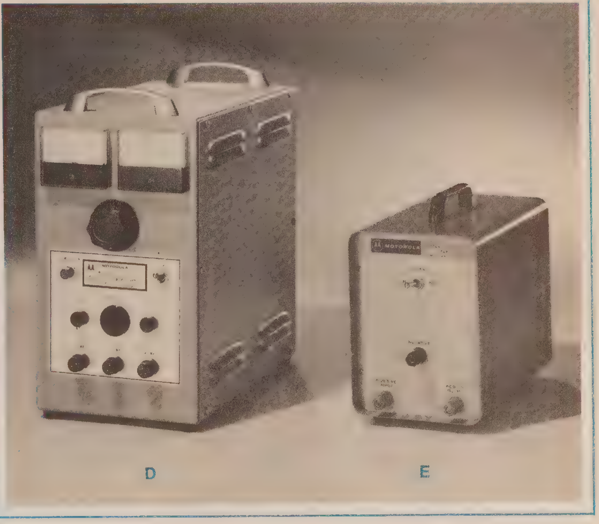


R-1011AA High-Current Power Supply (Formerly S-1346A)

SPECIFICATIONS

R-1011AA High Current Power Supply
DC Output: Two ranges, 1-20 volts, 1-40 volts. **Current Output:** Three ranges, 0-5 amp, 0-20 amp, 0-40 amp (30 amp continuous, 40 amp intermittent). **Continuous Power Rating:** 600 watts. **Regulation:** 0.1%. **Ripple & Noise:** 10 mV RMS. **Input Power:** 117 VAC ±10%, 50-60 Hz. **Operating Temperature:** 0° - 50°C. **Storage Temperature:** —40° +75°C. **Size:** 8″H x 16″W x 20″D. **Weight:** 80 pounds.

Variable Power Supply

C Variable dc output from 5-18 volts at 3 amps makes the Motorola S-1360A Power Supply ideal for servicing pagers, transceivers, and other electronic equipment. Separate voltage and current meters allow you to continuously monitor operating conditions. Regulation is ± 0.5% and ripple and noise are less than 3 mV rms. Short circuit protected.

S-1360A Variable Power Supply

Filtered DC Power Supply

D This filtered DC power supply combines compactness and versatility with the accuracy demanded in servicing of critical electronic equipment . . . high current rating and low ripple voltage eliminate need for batteries in normal usage. T-1064A is designed for aircraft, industrial and railroad applications.

T-1064A Power Supply. Est. shpg. wt. 56 lbs. (25.20 kg). Est. packaged dim. 18 x 12 x 21 in. (45.72 x 30.48 x 53.34 cm).

SPECIFICATIONS

T-1064A
DC Output: 0-85 VDC. **AC Output:** 0-135 VAC. **Metering Accuracy:** ±2% Full Scale. **Current Capacity:** DC Operation: Continuous—5 amps, Intermittent—7 amps; AC Operation—6 amps. **Ripple Content:** Less than 1%—5 amps. **Input Voltage:** 110-120 volts, 50-60 cycle AC. **Power Consumption:** Variable with load approximately 525 watts with 5 amp 64 VDC load. **Regulation:** Maximum 10-volt drop (receiver stand-by to full load 64 VDC operation). **Overall Dimensions:** 13½″ high x 8″ wide x 13″ deep. **Weight:** Approximately 50 lbs.

Ripple Filter

E Designed for the low to moderate current range, the TEK-15A Ripple Filter operates with any battery eliminator or other DC source up to 100 volts, reducing hum and ripple content to very low levels when servicing transistorized equipment.

A heavy duty switch permits bypassing the filter choke when the unit is used in high current applications or when regulation is more important than low ripple content, eliminating the voltage drop across the choke and improving regulation of the DC source.

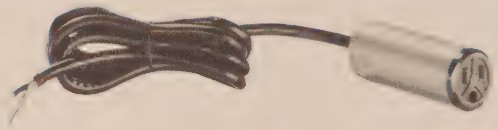
TEK-15A Ripple Filter. Est. shpg. wt. 19½ lbs. (8.78 kg). Est. packaged dim. 13 x 13 x 13¼ in. (33.02 x 33.02 x 33.66 cm).

MOTOROLA
DIODE TESTER
SLN 6205A
VOLT PROBE
GND
RED NEG
RED POS

A

MOTOROLA
5V DC/RF
1V DC/RF
5V RF 1V DC Ext Meter
15V DC/RF
100V DC
200V DC
Meter Reverse
Probe Ext Meter
MOTOROLA
DC/RF Alignment Meter

B



C

Diode Tester

A A battery-operated adapter used with Motorola DC multimeters to check the forward and reverse resistance of diodes and semiconductors.

SLN-6205A	Diode Tester (Includes 60-82458B01 "C" Dry Cell). Est. shpg. wt. 1½ lbs. (.68 kg). Est. packaged dim. 9 x 4¼ x 4¼ in. (22.86 x 10.80 cm).
60-82458B01	Spare battery, "C" dry cell.

DC/RF Alignment Meter

Battery Operation

B An excellent instrument for aligning and testing pocket receivers and transmitters. The unit covers RF ranges of .5, 1, 5, and 15V and DC ranges of .1, 1, 5, 15, 100 and 200V. A removable DC/RF probe with a built-in selector switch enables you to meter points within the receiver and transmitter. Accessory cable (no. 1-855413) allows unit to be used as separate tuning meter.

TEK-7B	Alignment Meter w/Probe. Est. shpg. wt. 2 lbs. (.90 kg). Est. packaged dim. 8¾ x 4¼ x 4¼ in. (22.23 x 10.80 x 10.80 cm).
TEKA-39A	Repl. R.F. Probe. Est. shpg. wt. 4 oz. (112 gr).
1-855413	Accessory Cable. Est. shpg. wt. 3 oz. (84 gr).

Converter-220V ac to 117V ac

C This handy unit allows 117 VAC powered instruments to be operated from 220 VAC lines. Specifications: Input: 220 VAC, 50/60 Hz, Output: 117 VAC, 50/60 Hz at 8 ma max.

SKN-6009A	220 VAC power cable. Est. shpg. wt. 8 oz. (224 gr). Est. packaged dim. 5¾ x 3 x 2 in. (14.61 x 7.62 x 5.08 cm).

Wattmeter and RF Load

A

B

Wattmeter

A This sturdy, compact meter is designed for plug-in, in-line elements. Simply clip the meter over the bi-directional element to read forward or reverse power. Elements may be left in antenna or transmission lines, eliminating the need to go off-the-air when measuring power. Separating the meter from the element automatically damps the meter movement for positive protection against mechanical shock during transit. Patented under U.S. Patent 4,009,477. Other patents pending.

Rugged, sealed elements provide long, trouble-free life. The r-f cavity and sense line is an integral part of the element, eliminating variations in accuracy, VSWR (voltage standing wave ratio), and losses in the measurement system throughout the life of the element.

Durable cases provide a convenient means for carrying and storing meter and elements. The meter case contains compartments for up to three elements. The accessory case holds up to 12 additional elements.

S-1350A	Wattmeter
ST-1198	Meter Carrying Case
ST-1199	Element Carrying Case
58-82273CO1	Male "N" to Female "UHF" Adaptor
58-83150DO1	Male "UHF" to Female "N" Adaptor
58-855270	Male "UHF' to Female "BNC" Adaptor
58-84300A98	Male "N" to Female "BNC" Adaptor

SPECIFICATIONS

Metering Method: Insertion type RF wattmeter. Indicates forward or reverse power by switch operation. **Emissions Measured:** CW or FM carrier. AM or TV at zero modulation only. **Frequency Range:** 25 MHz to 1 GHz with appropriate elements. **Power Measurement Ranges:** 2.5 watts to 1000 watts full scale with appropriate elements. **Accuracy:** ±5% full scale. **Input/Output Impedance:** 50 ohms. **VSWR:** 1.2:1 (typically 1.05:1). **Insertion Loss:** 250 mw max (25-100 MHz), 100 mw max (100-1000 MHz). **Minimum Directivity:** 25 dB. **Dimensions:** Meter: 4″ x 4¼″ x 3¼″ including feet, less element. Element: 1″ x 1¼″ x 5¼″ including connectors. **Weight:** Meter: 21 oz. Elements: 10 oz.

RF Load Resistor

B This unit provides the answer to the 2-way radio serviceman's need for a lightweight RF dummy load with an extensive range. The T-1013A will handle 300 watts of RF at 15-minute intervals or 150 watts continuous power. The continuous power rating can be extended to 225 watts, if sufficient air is kept moving past the cooling fins.

T-1013A	RF Load Resistor. Est. shpg. wt. 8½ lbs. (3.83 kg). Est. packaged dim. 20 x 7½ x 9 in. (50.80 x 19.05 x 22.86 cm).

SPECIFICATIONS

T-1013A RF Load Resistor.

Impedance: 50.0 ohms. **Standing Wave Ratio:** 1.2 or less. **Frequency Range:** 0-1000 MHz (usable to 3000 MHz). **Connectors:** "N" type. "UHF" type adapter provided. **Size:** 6 x 7⅛ x 12⅝ inches.

Wattmeter Elements

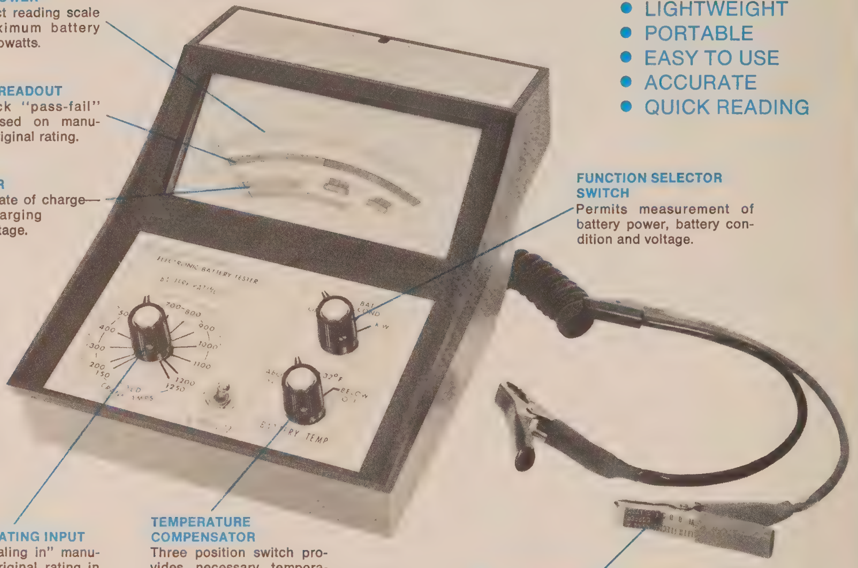
Frequency (MHz)	Maximum Power (Watts)	"N" Type Connector Model	"UHF" Type Connector Model
25-60	5	**ST-1280**	**ST-1281**
25-60	10	**ST-1285**	**ST-1284**
50-125	5	**ST-1283**	**ST-1282**
50-125	10	**ST-1286**	**ST-1287**
25-100	25	**ST-1204**	**ST-1244**
25-100	50	**ST-1205**	**ST-1245**
25-100	100	**ST-1206**	**ST-1246**
25-100	250	**ST-1207**	**ST-1247**
25-100	500	**ST-1208**	**ST-1248**
25-100	1000	**ST-1209**	**ST-1249**
100-250	5	**ST-1212**	**ST-1252**
100-250	10	**ST-1213**	**ST-1253**
100-250	25	**ST-1214**	**ST-1254**
100-250	50	**ST-1215**	**ST-1255**
100-250	100	**ST-1216**	**ST-1256**
100-250	250	**ST-1217**	**ST-1257**
100-250	500	**ST-1218**	**ST-1258**
100-250	1000	**ST-1219**	**ST-1259**
200-550	2.5	**ST-1221**	**ST-1261**
200-550	5	**ST-1222**	**ST-1262**
200-550	10	**ST-1223**	**ST-1263**
200-550	25	**ST-1224**	**ST-1264**
200-550	50	**ST-1225**	**ST-1265**
200-550	100	**ST-1226**	**ST-1266**
200-550	250	**ST-1227**	**ST-1267**
200-550	500	**ST-1228**	**ST-1268**
200-550	1000	**ST-1229**	**ST-1269**
500-1000	2.5	**ST-1231***	**ST-1271**
500-1000	5	**ST-1232***	**ST-1272**
500-1000	10	**ST-1233***	**ST-1273**
500-1000	25	**ST-1234***	**ST-1274**
500-1000	50	**ST-1235***	**ST-1275**
500-1000	100	**ST-1236***	**ST-1276**
500-1000	250	**ST-1237***	**ST-1277**
500-1000	500	**ST-1238***	**ST-1278**
500-1000	1000	**ST-1239***	**ST-1279**

*The N type connector is recommended for best accuracy in the 500-1000 MHz frequency range.

Motorola Electronic Vehicle Battery Tester*

FOR 6/12 VOLT BATTERIES UP TO 1250 AMPERES—SAE CRANKING PERFORMANCE RATING

Ideal for use in two-way radio servicing to insure that vehicle battery and charging system are in peak operating condition to power radio.



BATTERY POWER
Quick, direct reading scale shows maximum battery power in kilowatts.

PASS-FAIL READOUT
Gives quick "pass-fail" readout based on manufacturer's original rating.

VOLTMETER
Indicates state of charge—checks charging system voltage.

BATTERY RATING INPUT
Permits "dialing in" manufacturer's original rating in SAE cranking performance amperes, watts or amp-hours.

TEMPERATURE COMPENSATOR
Three position switch provides necessary temperature correction by merely estimating battery temperature.

- LIGHTWEIGHT
- PORTABLE
- EASY TO USE
- ACCURATE
- QUICK READING

FUNCTION SELECTOR SWITCH
Permits measurement of battery power, battery condition and voltage.

SPECIAL TWO CONDUCTOR CLIPS

MODERN SPACE AGE ELECTRONIC INSTRUMENT

A self contained, integrated circuit, electronic device for testing storage batteries without discharge. Entirely new concept measures the "conductance" of the battery. Gives quick, accurate and reproducible results that correlate well with established load tests. Since batteries are not discharged during test, the Motorola Electronic Battery Tester can be used equally well on small garden tractor batteries as well as diesel and industrial batteries.

Quick Reading

Instrument is simply clipped to the battery and switch turned to "KW." Meter shows maximum available power of battery. No need to make complicated measurements of amps, volts and time. Large 5½ inch meter.

No Load On Battery

Self-contained, no batteries, powered by battery under test. Draws less current than a glove compartment light bulb; does not discharge battery during test.

Shows Maximum Available Power

Measures the maximum power that battery can deliver; no calculations or corrections required.

Replaces Load Testers, Cell Voltmeters, Hydrometers

Load Testers must handle large currents and are, therefore, heavy cumbersome and expensive. Load Testers can also be harmful to the battery since they draw large currents. The Motorola Electronic Tester has the advantage of giving instant readings without discharging the battery and without the necessity of measuring amps, volts, time and temperature simultaneously.

R-1005A 6/12 Volt Electronic Battery Tester

SPECIFICATIONS

Measures 6 and 12 volt lead acid batteries rated from 150 to 1250 cold crank amps (25 to over 210 amp hours). **Readouts:** 0 to 18 kilowatts, 0 to 16 volts, color coded "good/replace" scale. Battery temperature compensation. Reverse polarity protection. Over-voltage protection. **Temperature Range:** —40°F to 140°F (—40°C to 60°C). **Weight:** 3.5 lbs.

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*Patent Pending. Manufactured by MOTOROLA INC. Automotive Products Division.

Battery Care Accessories

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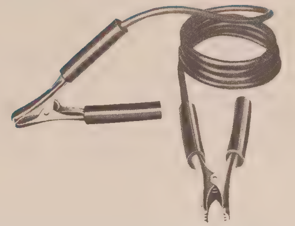
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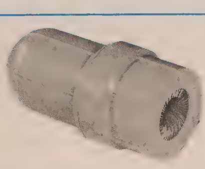
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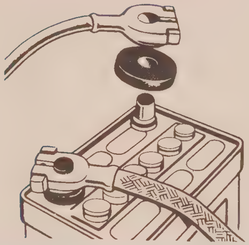
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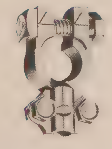
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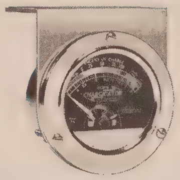
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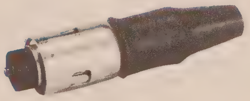
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Solid-State Charger

A This fully automatic charger is capable of delivering 20 amps at 12 volts and never lets the battery drop below 97% of full charge. Short circuit protection prevents damage to the unit even if the the terminal clips are accidentally connected together. Operates from 115/230V, 50-60 cycle.

ST-771 A Solid-State Charger

High Current, Heavy Duty Booster Cables

B Rugged steel clips with a heavy copper plating and 12 ft. of #4 gauge cable made up of 413 strands of #30 copper wire provide an exceptionally heavy duty cable for industrial use. The Triprene cable jacket is impervious to oil, acid, salt, and grease and retains its flexibility over a wide temperature range.

ST-835 High Current, Booster Cables

Post & Terminal Cleaner

C Brush away corrosion and oxidation from battery posts and cable terminals in seconds with this handy tool.

ST-774A Post & Terminal Cleaner

Felt Terminal Guards

D Felt Terminal Guards.

ST-775 Battery Terminal Guards

Universal Battery Clamp

E Fits either the positive or negative post of any battery and any size cable.

42-84066A77 Universal Battery Clamp

Hickok Chargicators

F The ST-596 Chargicator mounts directly under the dash of a vehicle and constantly indicates the vehicle's battery load when the engine is running. Shipping Weight: ¾ lb.

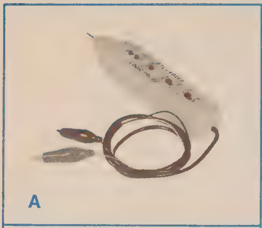
ST-596 For 12 volt.

Charger Plug

G Convenient cigarette lighter connector (cable not supplied) for charging vehicle battery through cigarette lighter. No need to raise hood. Easy to install. Connector rated at 10 amps maximum.

28-82620C01

Probes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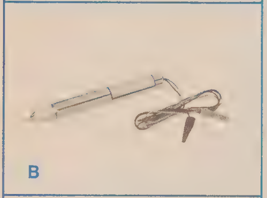
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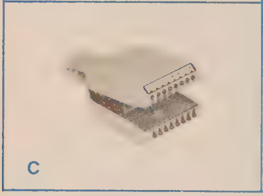
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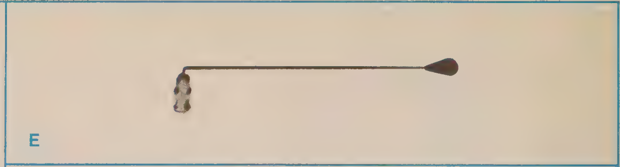
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12V DC
VAC
Off
MOTOROLA
Running Time Meter
F

Logic Probes

For Cmos, DTL, TTL, RTL logic—Mobile Data Systems, Teleprinter and other digital circuits.

A For detecting and indicating logic levels and the presence and polarity of single pulses of very short durations. Indicator lamps provide an immediate visual indication of the condition existing in the circuit under test for step by step logic state testing. Simply connect to 5V source and ground on the board being tested.

SPECIFICATIONS

RTL-4014A Logic Probe

Input Impedance: 100,000 Ohms. DTL-TTL Thresholds (Switch Selectable): Logic 1 (HI-LED)—2.25V ±.015V; Logic 0 (LO-LED)—0.85V ±.010V. HTL-CMOS Thresholds (Switch Selectable): Logic 1 (HI-LED)—70% Vcc; Logic 0 (LO-LED)—30% Vcc. **Min. Detectable Pulse Width:** 50 nanoseconds. **Max. Input Signal Frequency:** greater than 10 MHz. Pulse Detector (Pulse LED) [Switch Selectable]: High Speed pulse train or single events (+ or — transitions) activate ⅓ second pulse stretcher. Pulse Memory (Pulse LED) [Switch Selectable]: Pulse or Level transition detected and stored until reset. **Input Overload Protection:** ±50V continuous 117 VAC for less than 15 seconds. **Power Requirements:** 5 Volt Vcc, 30 Ma; 15 Volt Vcc, 40 Ma; 36 volts max., with power lead reversal protection.

B Especially designed for testing 3.6V dc RTL logic, such as used in the Motorola teleprinter.

SPECIFICATIONS

SLN-6395A RTL Logic Probe

Vcc: 3.6V dc. **Logic low "0":** 0 to 0.35. **Logic high "1":** 0.8V dc to vcc compatible with 3.6V dc, RTL logic. **Standby current:** 80 mA. **Maximum current drain, all 3 lamps working:** 250 mA.

Logic Monitor

C The most convenient and efficient way developed to check digital IC's. Clip it over any DTL, TTL, HTL and Cmos dip IC up to 16 pins. Each contact connects to a single "bit" detector with high-intensity LED readout, activated when the applied voltage exceeds a fixed 2V threshold. Logic 1 turns LED on; logic 0 (low voltage on open crt) keeps LED off. A power-seeking gate network automatically locates supply leads and feeds them to the logic monitor.

SPECIFICATIONS

RTL-4015A Logic Monitor

Input Threshold: 2V ±0.2 volts. **Input Impedance:** 100,000 Ohms. **Input Voltage Range:** 4 volts minimum 15 volts maximum across any two or more input leads. **Max. Current Drain:** 200 ma @ 10 volts. **Max. Input Frequency***:10,000 Hz 50% duty cycle.

*Will respond to signals up to 0.1 MHz when the input signal swing exceeds the threshold voltage by more than 015 volts.

Whip Length Tester

D Triple chrome plated, 3 section 96″ tube assembly mounted on marked stainless steel base adapter. Used for testing proper whip length before cutting to frequency in 30 to 50 MHz band.

ST-599 Whip Length Tester

Instrument Antennas

E Terminated in male BNC connector. Can be used with any deviation or frequency meter.

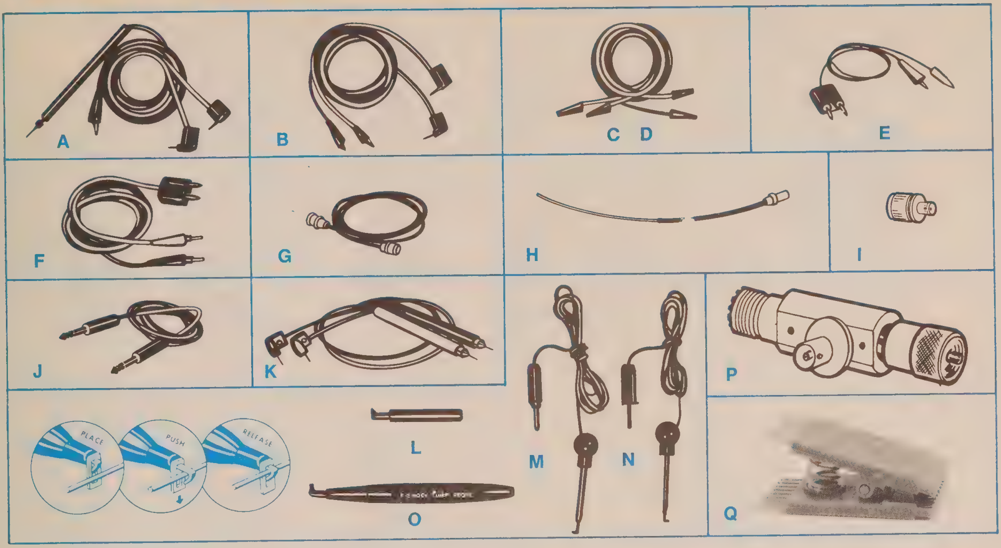
SAN-6000A	Antenna 8″ long.
TEKA-24A	Antenna 17″ long.

Running Time Meter

F These running time meters can be used to keep track of operating time of equipment, time spent on service calls, or any other operation where a record of the time spent may be useful. 12V dc or 117V ac operation.

ST-861A	12V dc/117V ac. Est. Shpg. wt. 3 lbs. (1.35 kg.) Est. packaged dim. 9 x 4 x 4 in. (22.86 x 10.16 x 10.16 cm.)
ST-885	AC line plug only for model ST-861A. Est. shpg. wt. 4 oz. (112 gr.) Est. packaged dim. 5½ x 3 x 2 in. (13.97 x 7.62 x 5.08 cm.)

Test Leads and Coupling Unit



Test Leads

Boost your servicing efficiency in the shop and field with these handy test leads. Test leads "A" and "B" are general purpose leads which can be used with the TEK-1A, 5B, 20 or 21. Leads "C" and "D" are all-purpose jumper leads, "E" is used with the S-1067A Audio Oscillator and S-1053C AC voltmeter, "F" is used with the TEK-34 series Universal Tone Generator and "G" thru "J" are used with Motorola Test Set and Deluxe Universal Control Panel.

A Test leads wtih right angle pin tips, 1 minigator clip and 1 prod.
TEKA-19 Est. shpg. wt. 4 oz. (112 gr).

B Test leads with right angle pin tips and minigator clips.
TEKA-18 Est. shpg. wt. 4 oz. (112 gr).

C Test leads with crocodile clips.
TEKA-20 Est. packaged dim. 3½ x 4 x 2 in. (8.89 x 10.16 x 5.08 cm).

D Test leads with minigator clips.
TEKA-21 Est. shpg. wt. 4 oz. (112 gr).

E Shielded test lead cable kit with dual banana plug and alligator clips.
SKN-6001A Est. shpg. wt. 1 oz. (28 gr).

F Test lead cable kit with dual banana plug and crocodile clips.
TEKA-63 Est. shpg. wt. 3 oz. (84 gr.)

G RF probe cable terminated in female BNC connector.
1-855415 Est. shpg. wt. 2 oz. (56 gr).

H 4'-RF probe extension cable terminated in male BNC connectors.
1-855414 Est. shpg. wt. 4 oz. (112 gr).

I UHF-BNC adaptor for RF probe extension cable.
58-855207 Est. shpg. wt. 2 oz. (56 gr).

J 4'-accessory cable termniated in 3 circuit phone plugs.
1-855413 Est. shpg. wt. 3 oz. (84 gr).

K Test leads with right angle pin tips and prods—one red and one black.
TEKA-82 Est. shpg. wt. 3 oz. (84 gr).

E-Z HOOK Test Connectors

Patented hook tip connects anywhere. 1. Push to connect. 2. Push again to remove. Won't cut or nick. Won't short or jump off. Leaves your hands free for other tasks. "Q" ball design provides positive control for sub-miniature jobs. "Q" ball clips may also be used as a tiny mechanical hand for small parts.

L Tip adapter for .06" needle probe.
ST-877 Est. shpg. wt ½ oz. (14 gr).

L Tip adapter for .08" standard probe.
ST-878 Est. shpg. wt. ½ oz. (14 gr).

L Jumper-meter clips. Simply pull apart to attach your lead. Solder connection and strain relief assures long, trouble-free life.
ST-879 Est. shpg. wt. ½ oz. (14 gr).

M "Q" ball with lead and banana tip.
ST-893 Est. shpg. wt. ½ oz. (14 gr).

N "Q" ball with lead and standard tip.
ST-880 Est. shpg. wt. ½ oz. (14 gr).

O Custom probe. Screw-on cover and special terminals allow you to custom design your own E-Z hook probe.
ST-881 Est. shpg. wt. 1 oz. (28 gr).

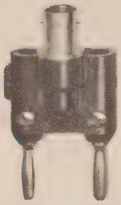
In-Line Coupling Unit With Adjustable Tap-Off

P This unique male and female UHF, in-line coupling unit features an adjustable BNC female tap-off. Use it with any frequency meter to monitor the output of low or medium power mobiles. Simply insert the coupling unit in series with the r-f cable going to the wattmeter or dummy load. Depending on output power, loosen the jam nut and rotate the BNC tap-off to obtain the desired attenuation coupling.
SLN-6321A Est. shpg. wt. 8 oz. (224 gr).

Dip-Clip

Q The "Dip-Clip" is specially designed to allow the attachment of test probes to 14 or 16 lead DIPS (Dual In-Line Packages). The unique, patented design greatly reduces the possibility of accidental shorting while testing live circuits. Numerous test probes may be quickly connected for hands-free testing.
ST-1190 Dip-Clip

Connectors and Adaptors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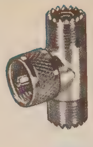
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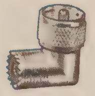
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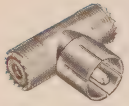
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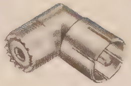
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N

O

P

Q

R

Banana to Coax BNC Connector

A The 58-84066A74 Banana Plug Adapter permits coaxial cable with BNC connectors to be used with equipment having banana jacks. Connect the coaxial cable to one end, and plug the adapter into the banana jacks on the equipment. The banana plugs on the adapter are on standard ¾″ centers, and the adapters may be stacked.

58-84066A74 Banana Plug Adapter

BNC Connectors

MIL OR OTHER NO.	FIG.	DESCRIPTION	PART NUMBER
UG491A/U	B	Male Straight Adapter	**58-82777A01**
UG914/U	C	Female Straight Adapter	**58-82577B01**
UG273/U	D	Male UHF Female BNC Adapter	**58-855270**
UG274/U	E	"TEE"	**9-82578B01**
UG-255/U	F	Femal UHF and Male BNC Adapter	**58-84300A99**
UG201A/U	G	Male "N" and Male BNC Adapter	**58-84300A98**

UHF & Type "N" Connectors

MIL OR OTHER NO.	FIG.	DESCRIPTION	PART NUMBER
M358	H	"Tee" UHF	**9-86150**
PL258	I	Straight-through UHF	**58-109152**
UG646/U	J	Right Angle UHF	**28-48250**
UG146/U	K	Male "N" and Female UHF Adapter	**58-82273C01**

"Quick Change" Connectors

Just "push 'em on or pull 'em off." They save time by eliminating the "threading-on" of standard UHF connectors used in routine servicing.

FIG.	DESCRIPTION	PART NUMBER
L	"Quick Change" "T" Connector	**58-82350D01**
M	"Quick Change" Right Angle Connector	**58-82350D02**
N	"Quick Change" Ferrule only for PL-259 (28-42310)	**58-82093E01**

Other Coax Connectors

MIL OR ORDER NO.	FIG.	DESCRIPTION	PART NUMBER
UG536/U	O	Male "N" plug for RG58A/U hole .212″	**28-852527**
UG88/U	P	Male BNC plug for RG58A/U	**28-844876**

RG 8/U, 9/U & 11/U Connectors

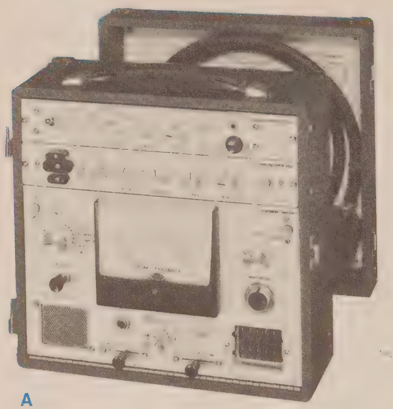
MIL OR OTHER NO.	FIG.	DESCRIPTION	PART NUMBER
PL-259	Q	Plug PL-259 insulation glass filled diallyphthalate insulation. Suggested use VHF frequencies and below. (Nickel plated barrel causes soldering of braid to be difficult.)	**24-42310**
PL-259	Q	PL-259 plug teflon insulation. Suggested use all VHF & UHF frequencies up to 1 GHz. (Nickel plated barrel causes soldering of braid to be difficult.)	**28-82021G01**
PL-259	Q	PL-259 plug same as 28-82021G01 except barrel is silver plated which allows easy soldering of the braid.	**28-80325A29**
	R	Reducer used with PL-259 for RG58/U or RG142/U, .207″ ID (UG175/U)	**58-854020**

The Parts Department
of the Motorola Communications Group

Production

Parts Department production lines in Lombard, Illinois produce many types of test equipment plus assemblies and kits for radios no longer in production.

Portable Test Set



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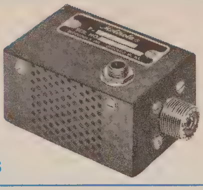

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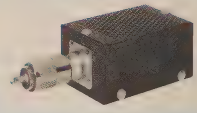

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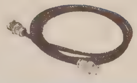
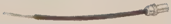


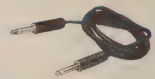
4′—RF Probe Extension Cable
1-855414

IF Crystal



RF Probe Cable
1-855415

UHF-BNC
Adapter for RF Probe
Extension Cable
58-855270



4′ Accessory Cable
1-855413

Accessories Included With Test Set

Portable Test Set

Brushed aluminum front panels and standard Motorola colors give instruments that precision, quality look. Customers, technicians, and other personnel can better appreciate your test equipment investment.

A Motorola Portable Test Set connects to metering socket in radio for testing and aligning base station and mobile transmitters and receivers, regardless of operating voltage. Large, easy-to-read metering chart in cover—shows how to set selector switch for transmitter and receiver metering positions. Large, clear meter scales; 0-50 microamperes for readings in test positions; —25—0+25 (zero center) for discriminator alignment; 0-1000 volts DC for B+; 0-15 volts DC for A+; 0.30 volts DC for microphone DC. Uses precision 2% resistors and 4-inch, 2% microammeter.

Transistorized IF Oscillator provides signal for IF alignment, 350 kHz to 13 MHz. Switch selects one of three crystals —455 kHz crystal supplied, sockets in chassis for plugging in 5.5 MHz and 12 MHz crystals (or others, as required). Test set with RF peaking generator (optional) provides total of 12 crystal-controlled alignment frequencies.

Transistorized Audio Voltmeter accurately measures receiver audio output for 20 db quieting sensitivity test: 0-0.2 volts and 0-2 volts AC scales selected by switch on control panel. Also checks transmitter audio input directly through metering cable; can be used in setting base station line input controls, audio line levels and remote control console outputs.

S-1056B	Test Set, shipping weight: 15 lbs.
S-1057B	Test Set With Peaking Generator, shipping weight: 16 lbs.
S-1058B	Test Set With Deviation Meter, shipping weight: 18 lbs.
S-1059B	Test Set With Peaking Generator & Deviation Meter, shipping weight: 20 lbs.
SKN-6012B	Metering cable, terminated in 12 pin Motrac/Motran type connector
SKN-6013B	Metering cable, terminated in 11 pin standard connector: (included with above test sets as standard cable)
TKN-6025A	Adaptor cable for SKN-6013A & B. Converts 11 pin to small 12 pin Motrac/Motran
TEK-37A	Test set adaptor for "Micor" series includes 2 TEKA-72 test cables. Note: requires modification to all test sets shipped prior to Jan. 1, 1970.
TEKA-72A	Spare "Micor" test cable (can be used for metering or control)
TEKA-74A	Microphone adaptor, std. 4-prong to "Micor"
NKN-6099A	PT400 series metering adaptor cable
AUL-1*†	Peaking Generator Crystal (For Receiver Alignment)
AUL-X*†	Peaking Generator Crystal (For use with Deviation Meter)
AQL†	Test Set Crystal 350 kHz to 800 kHz
ANL†	Test Set Crystal 1.25 MHz to 13 MHz
60-82455G01	repl. battery (1½V. "D" cells) 4 req. (heavy duty industrial)
60-855262	repl. battery (1½V. "N" cells) 1 req.
SLN-6294A	Case w/cover and carrying handle (for replacement)

*Specify equipment operating frequency.

†Supplied by Motorola component products department.

Optional Accessories for Portable Test Sets

B The P-7208 Wattmeter Load is used in conjunction with Motorola Test Sets or a 0-50 micrometer to measure transmitter R.F. power output.

A calibration chart is supplied for use in correlating power dissipated in the load unit and the meter reading over the ranges of 25-50 MHz, 152-174 MHz, and 450-470 MHz.

P-7208 60 Watt Dummy Load, Shipping Weight: ¾ lb.

C New low cost 8 watt RF load usable to 512 MHz. With UHF male plug.

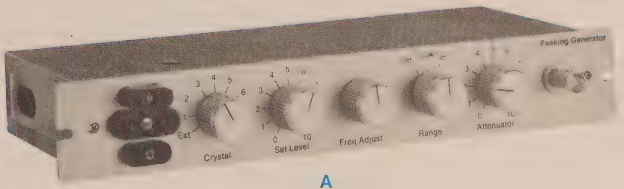
S-1361A RF Load

D Coaxial interconnect cables for connecting the transmitter to wattmeter and/or connecting wattmeter to termination load. Cables are terminated in PL/259 connectors.

1-891949 Coaxial Cable 12″, Shipping Weight: ¼ lb.

1-850834 Coaxial Cable 24″, Shipping Weight: ¼ lb.

See Following Pages for Additional Metering and Adaptor Cables



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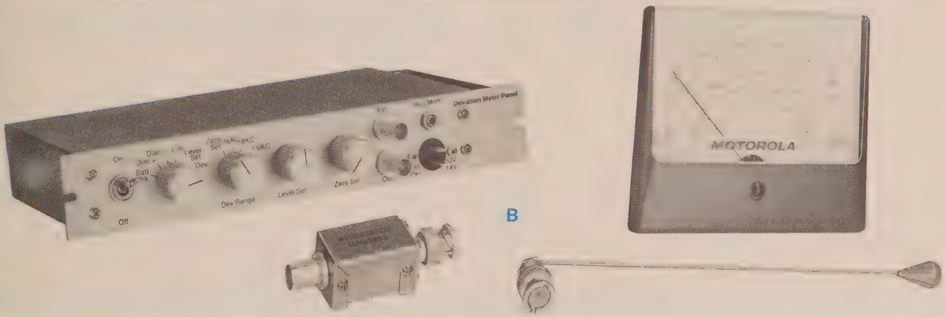


B

Peaking Generator

A The Model SLN-6057 Peaking Generator is a crystal-controlled signal source which provides RF signals ranging from 4 MHz to 960 MHz. The generator is used for peaking of the RF stages of FM communication receivers operating within the 4 to 960 MHz range. It also provides normally encountered intermediate frequencies for alignment of receiver IF stages.

The peaking generator essentially consists of a transistorized oscillator, internal and external crystal sockets, tuned circuits and front mounted controls and switches. It requires a separate 6 volt DC power source. The transistorized oscillator will operate properly only with anti-resonant crystals.

The peaking generator is supplied with the S-1057, and the S-1059 Portable Test Sets. It may also be purchased as a separate item to be mounted in the TU-546, S-1056, or the S-1058 Portable Test Sets. When mounted in the test set housing, the generator uses the battery supply built into the test set.

SLN-6057A	RF Peaking Generator, shipping weight: 2½ lbs.
AUL-1†	Peaking Generator Crystal For Receiver Alignment
AUL-X†	Peaking Generator Crystal For use with Deviation Meter
ANL†	Crystal for I.F. Alignment 4 MHz to 6 MHz and 10 MHz to 13 MHz
AUL†	Crystal for I.F. Alignment 6 MHz to 10 MHz

†Supplied by Motorola Components Products Department.

Deviation Meter and Panel Meter Conversion Kit

B The S-1062 Deviation instrument and Panel Meter Kit utilizes a 455 MHz IF strip with a special discriminator and a peak-to-peak reading voltmeter. Fits directly into recent Motorola Test Sets and is used in conjunction with a signal generator or peaking generator as the local oscillator source.

While the SLN-6080A Attenuator is designed for use with the S-1062 Deviation Meter, it can be used with any instrument where the signal is excessive.

S-1062B	Kit includes Deviation Instrument, Panel Meter, Attenuator, Antenna and Battery. Shipping Weight: 5½ lbs.
SLN-6080A	Spare attenuator
60-863919	Spare battery, mercury, 2 required
SAN-6000A	Antenna
72-82534D01	Meter

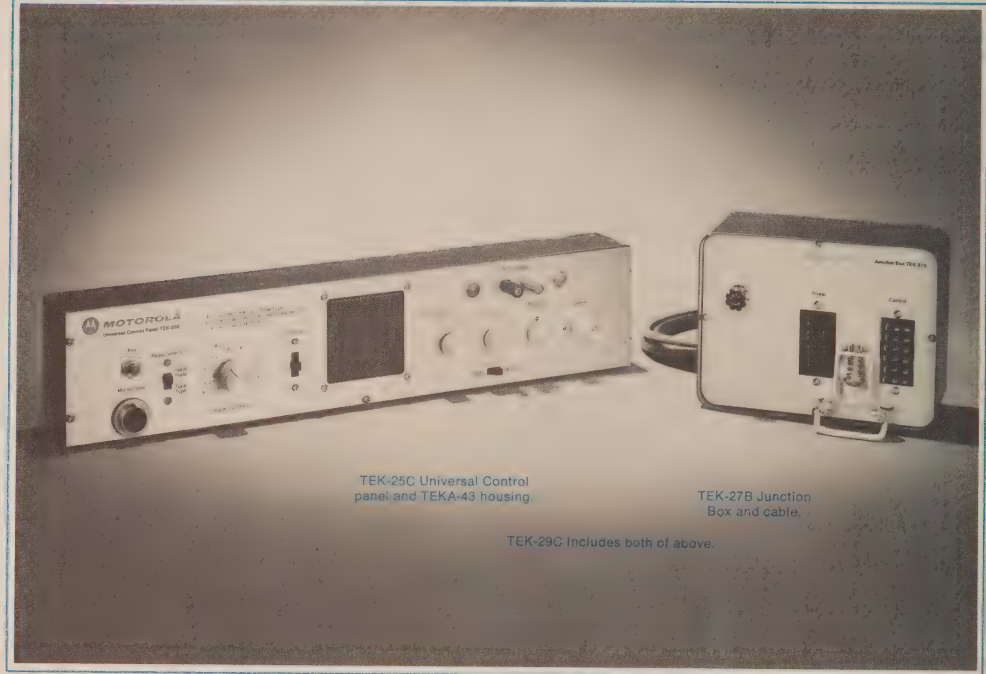
SPECIFICATIONS

Deviation Meter

Frequency Range: 20 MHz-500 MHz. **Deviation range:** 1.6 KHz, 8 KHz, & 16 KHz. **Operating temperature range:** With Mercury Batteries +10°C to +50°C. External Power +0°C to +50°C. (Output of internal Mercury Batteries reduced by temperatures below 10°C.) **Sensitivity:** (With Peaking Generator or .1 v Signal Generator on Fundamentals), Low Band 1 millivolt, High Band 3 millivolts, 450 MHz 20 millivolts. **Accuracy:** 16 KHz Range ±5% of full scale, 8 KHz Range ±5% of full scale, 1.6 KHz Range ±10% of full scale, at 5 KHz, 6.67 KHz and 15 KHz ±5% of reading. **Power supply:** 2 mercury batteries, 40 hour life at room temperature. Connector for external 12 ±2 VDC Supply. (Part number 60-863919.) **Signal monitoring:** (Aural or Scope)—Phone Jack. **Transistors:** Five in I.F. strip, three in R.F. spectrum generator/amplifier and five in audio amplifier.

IMPORTANT NOTE—Type AUL crystals normally used with the standard Motorola Peaking Generator cannot be used when the instrument is operated in conjunction with the Deviation Meter. Since thy are used as a local oscillator source for the Deviation Meter, a different formula is required to determine crystal frequency. Always specify actual transmitter frequency and type AUL-X crystal. Example: AUL-X at 159.995 MHz.

Universal Control Panel Saves Time, Money, Space



TEK-25C Universal Control panel and TEKA-43 housing.

TEK-27B Junction Box and cable.

TEK-29C Includes both of above.

Brushed aluminum front panels and standard Motorola colors give instruments that precision, quality look. Customers, technicians, and other personnel can better appreciate your test equipment investment.

Eliminate multiple control heads, microphones and cables for mobile servicing with the time and money saving Motorola Universal Control Panel. This compact unit fulfills all of the requirements for testing the majority of Motorola mobile units with a minimum amount of accessories . . . just an added cable or two is all you need . . . ideal for the shop, even more advantageous in the service vehicle!

The TEK-25/TEK-29 is capable of operating 1 and 2 frequency and 4 frequency mobile units including the latest "Micor" series radio. Multi-colored scales on the frequency selector switch provide quick selection of switch positions versus radio being tested.

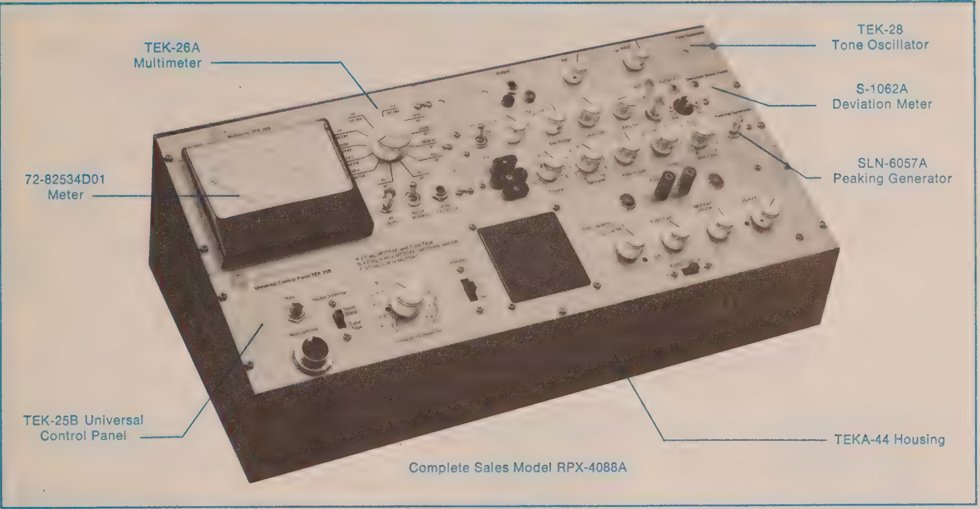
Combination above consists of the TEK-25 basic control panel, the TEKA-43 metal housing which protects the unit and the TEK-27B Junction Box with cable. Order the complete assembly as the TEK-29 Universal Control Panel. Models included can also be ordered separately.

TEK-29C	Complete with TEK-25B Universal Control Panel, TEK-27 Junction Box Cable, and TEKA-43 Housing.
TEK-25C	Universal Control Panel (less housing and junction box)
TEK-27B	Junction Box and Cable
PK-517	"Micor" and four freq. conversion kit for TEK-25. Note: Required only with TEK-25; not required with TEK-25A or B
TEKA-74	"Micor" mic adaptor to std. 4-prong plug

Accessory Power and Control Cables

MOBILE EQUIPMENT	VOLTAGE	ORDER CABLE KIT
(15″ Housing) FMTR, FMTRU80, 140 D Series, "Research Line" Radio	12 Volt Only	**TEKA-45**
(15″ Housing) T51G and T51 GGV (Vibrator Models), T44A Series, 6/12 Equipment	12 Volt Only	**TEKA-46**
(15″ Housing) T51, T53 GAD, GJD (Dynamotor Models) T51, T61, T71 ("T-Power" Models)	12 Volt Only	**TEKA-47**
"Motrac" Radio All Models Except Railroad	12 Volt Only	**TEKA-48**
(10″ Housing) FMTR, FMTRU41V "Uni-Channel" Series	6 or 12 Volt **TK-214** Adapter Cable also required	**TEKA-49**
T41G and T43G Series, T41 GGV and T43 GGV Series, 6/12 Series	12 Volt Only	**TEKA-49**
U41 and U43 GGT Series "T-Power" Radio	12 Volt Only	**TEKA-49**
Dash Mount, D41, D41G GGV Series	12 Volt Only	**TEKA-54**
Business "Dispatcher" D31 and D33 BMT, CMT Series	12 Volt Only	**TEKA-55**
Maritime radio cable (adapts to TEKA-48)	12 Volt Only	**ST-873**
Adaptor cable for "Micor" series radio using 37 pin control and power connector	12 Volt Only	**TEKA-50**

Deluxe Universal Control Panel



Complete Sales Model RPX-4088A

Deluxe Universal Control Panel

Outstanding accessories in the Deluxe Universal Control Panel extend versatility to the utmost . . . make it your soundest investment. Buy it complete for mounting on your bench or in your vehicle . . . start with the master housing and control panel and add the units you want, when you want them. Blank panels are available for installation in vacant spaces.

RPX-4088A	Deluxe Universal Control Panel (Includes all items shown)

Tone Oscillator

This panel version of the popular TEK-1 Tone Oscillator provides a variable source of 400 and 1,000 cps. A cable with a 4 prong plug supplied with the unit, enables connection directly to late model Motorola test sets, as well as the Universal Control Panel and the Motorola TEK-5 Meter Panel. TEK-28 mounts neatly into the master housing or in the Motorola test set.

TEK-28A Tone Oscillator

Multimeter Panel

Multimeter Panel (less meter) mounts securely in the master housing and with the 72-D82534D01 meter supplied with the S-1062 Deviation Meter Conversion Kit provides a deviation meter similar to that used in the Motorola Test Set. The meter can also be purchased separately, if the Deviation Instrument is not desired.

Other features of the TEK-26 Multimeter include:

• A 12-position switch for Deviation Meter, External Meter, .1VDC/5VRF, 1VDC/RF, 5VDC/RF, 15VDCRF, 100VDC/RF, 200VDC, Bench DC, 455 kHz, .2VAC and 2VAC. • An IF oscillator for use with a 455 kHz crystal (crystal not supplied). • AC voltmeter circuitry to measure the audio input of a transmitter via the mike receptacle of the basic control panel.

In addition, a meter reversing switch, an RF output BNC connector and a phone jack for an external 50 microamp connection is provided. The Motorola TEKA 39 Probe (optional) can also be used for making the DC and RF metering tests.

TEK-26A	Multimeter Panel (less meter) for use with S-1062 Dev. Meter
72-82534D01	Meter only
TEKA-39	DC/RF Probe

Deviation Meter

See test set for complete description

This all-inclusive instrument provides: • Checking RF stages in the 2 MHz to 960 MHz ranges. • Measuring deviation in the 1.6, 8 and 16 kHz ranges. • Tone oscillator facilities for checking transmitter deviation, setting tone levels on remotes, adjusting IDC circuits and other measurements. • Complete Multimeter functions. • IF Generator. • AC Voltmeter.

The model S-1062 conversion kit is ideally suited to the Deluxe Universal Control Panel and also can be added to the Portable Test Set. It utilizes a 455 kHz IF strip with a special discriminator and a peak-to-peak reading voltmeter. The unit provides 3 deviation ranges down to zero to 1.6 kHz making it ideal for "Private-Line" or other tone systems where low deviation values must be measured. Covering all 2-way radio frequencies, the unit features an excellent accuracy factor of ±5% at the 16 and 8 kHz range and ±10% at the 1.6 kHz range.

S-1062B	Deviation Instrument and Panel Meter Kit

Peaking Generator

See test set for complete description

This accessory provides a crystal-control signal source for RF signals ranging from 2 to 960 MHz. Its full operation is identical to that which is obtained when used in Motorola Test Sets.

SLN-6057B Peaking Generator

AUL-1† Peaking Generator Crystal for Receiver Alignment.

AUL-X† Peaking Generator Crystal for Deviation Meter.

ANL† Crystal For I-F Alignment 4MHz to 6MHz and 10MHz to 13MHz

AUL† Crystal For I-F Alignment 6MHz to 10MHz

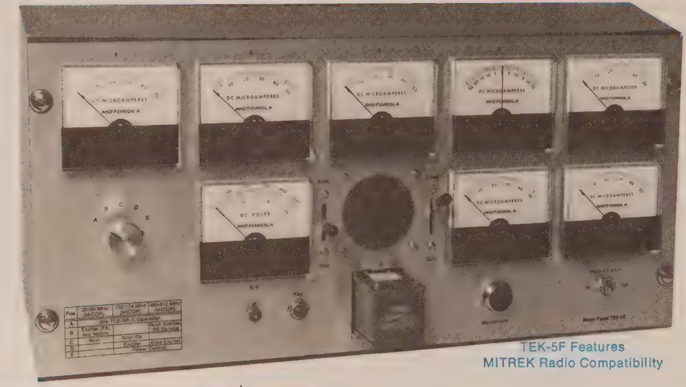
†Supplied by Motorola Component Products Department.

Housing and Blank Panels

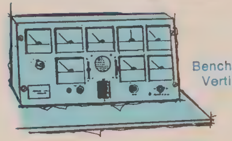
See meter panel for housing details

TEKA-44	Housing 8⅞" x 19" includes mtg. hardware
64-82023K01	Brushed Aluminum (Motorola) 1⅝" x 10⅝" (replaces 64-82023K02)
64-82832H02	Brushed Aluminum (Blank) 4⅞" x 8⅜"

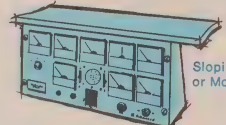
Meter Panel Offers Outstanding Benefits for the Serviceman



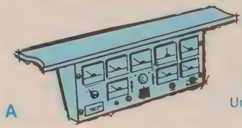
TEK-5F Features MITREK Radio Compatibility



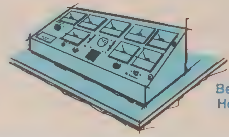
Bench Top Vertical



Sloping Under Shelf or Mounting on Wall



Vertical Under Shelf



Bench Top Horizontal

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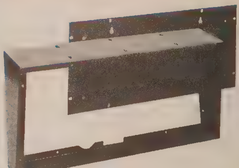


B

• Panel Styled for improved legibility. Saves time, simplifies operation. • "Wide-Vue" Meters — enhance readability for greater accuracy — less chance for error. • Expanded Zero-Center Meter (25—0—25 μa) means greater accuracy in discriminator settings. • Direct-Reading A+ and B+ Meters A+, 0-10 and 0-20 VDC; B+ 0-1000 VDC. • Versatile design permits undershelf, upright, or console mounting.

A Latest version TEK-5F Meter Panel can be used to service all Motorola radios with metering sockets. A front panel switch reverses polarity on meters 1 and 2 for servicing "MITREK" Radios. Brushed aluminum front panels and standard Motorola colors give that precision, quality look that makes customers, technicians, and other personnel appreciate your test equipment investment.

When connected to metering socket in radio the TEK-5 Meter Panel assures efficiency and saves time for the serviceman by providing simultaneous metering of positions one through six on transmitter or receiver—plus power amplifier plate current readings of the transmitter or audio output of the receiver.

The TEK-5 is particularly useful in fast detection of malfunctioning or intermittent sections of receivers or transmitters. The meter panel includes a built-in speaker that can be switched "in" or "out". In the "out" position, a load resistor is placed in the circuit. Position "4" is monitored by a 25-0-25 μa zero-center meter that provides a more precise reading during receiver alignment. On "Transmit," a shunt resistor is automatically switched in, changing meter sensitivity to 0-50 μa. Keying the transmitter can be carried out through use of a test microphone or a push switch located on the meter panel.

Metering and Control Cables are not supplied and must be ordered separately. Note: TEKA-72A cables are supplied with TEK-37 test set adaptor and can be used with this conversion panel.

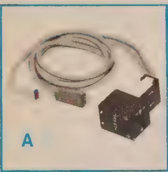
TEK-5F	Meter Panel Complete with Housing
SKN-6029A	"Metering Cable for "MAXAR" Radios, "MOXY" Radios, & MITREK Radios
TEKA-72A	Metering/Control Cable for MICOR Radios
SKN-6012B	Metering Cable, 12-pin MOTRAC/MOTRAN plug
SKN-6013B	Metering Cable, 11-pin plug
RPX-4053A	"MITREK" Radio Conversion Kit for TEK-5 (A-E)
TEK-40	MICOR Radio Conversion Kit for TEK-5B & C
TEKA-44	Replacement Housing & Rear Panel

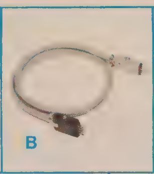
Meter Panel and Deluxe Universal Control Panel Housing

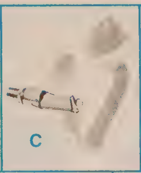
B This unique, versatile housing is especially designed for use with the TEK-5 Meter Panel and the Motorola Universal Control Panel. The unique form-factor of this unit allows it to be set either vertically or horizontally on a bench top or mounted vertically, with or without a sloping front panel, under a shelf. Use blank panels to fill in vacant spaces in Deluxe Universal Control Panel.

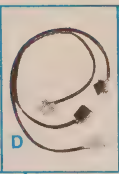
TEKA-44	Housing complete with panel mounting hardware
64-82023K01	Brushed Aluminum Panel (Motorola) 1⅝" x 10⅝" (replaces 64-82023K02)
64-82832H02	Brushed Aluminum Panel (blank) 4⅞" x 8⅜"

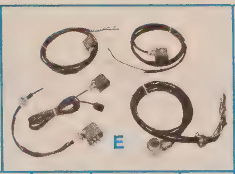
Metering and Adapter Cables

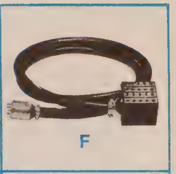


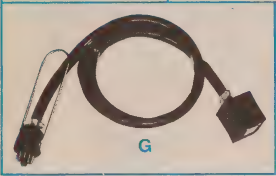


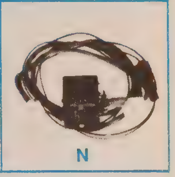












MICOR Radio Test Set Adaptor

A The TEK-37A test set adaptor can be used in conjunction with any TU-546 series or S-1056 to S-1059 test set. It consists of a 20 pin plug with switches and two TEKA-72A cables (1 control, 1 metering) to provide the necessary control and meter functions when testing the MICOR series radio. The adaptor provides receiver audio monitoring through the test set speaker, audio input and keying functions for the transmitter, and metering for all boards.

The kit is supplied with instructions for modifications which must be made to all TU-546 and S-1056A to S-1059A test sets, shipped before Jan. 1, 1970.

TEK-37A	MICOR Radio test set adaptor w/ cables complete

MICOR Radio Test Cable

B In conjunction with a Motorola test set or meter panel, the TEKA-72A MICOR Radio test cable is used as a metering cable or, with a slight modification, as a control cable for the MICOR radio. It consists of a 7-conductor cable with a 7-contact male MICOR Radio connector plug at each end; one red and the other natural aluminum.

TEKA-72A	MICOR Radio Test Cable

MICOR Radio Microphone Adapter Plug

C The TEKA-74 adaptor plug permits the use of the MICOR Radio microphone with MOTRAC Radio circular, four-conductor receptacles.

TEKA-74	MICOR Radio to 4-prong mic. receptacle

Railroad MICOR Radio Extension Cable

D Provides the capability of removing the entire power supply deck from the Railroad MICOR Radio and reconnecting to the radio with the extension cable.

TEKA-80	Railroad MICOR Radio Extension Cable

Railroad MICOR Radio Bench Test Cable

E This kit provides interconnection for bench testing of the Railroad MICOR Radio. It may be used with standard AAR models when removed from the mounting rack.

TKN-6044A	Railroad MICOR Radio Bench Test Cable

Metering Cable

F Designed for use with the S-1056 series Test Sets and TEK-5 Meter Panel, this assembly includes length of cable with 20-pin connector that plugs into test set or meter panel and terminates in 12-pin miniature plug. For use with MOTRAC, MOTRAN and solid state base station equipment.

SKN-6012B	Metering Cable

Metering Cable

G The SKN-6013B Metering Cable consists of a 20-pin connector that plugs into test set or meter panel and is terminated on the other end of an 11-pin plug (supplied with the S-1056 series Test Set).

SKN-6013B	Metering Cable

Adapter Cable

H Adapts the standard 11-pin test set series metering cable to be used with the current MOTRAC, MOTRAN mobile radios and solid state base station equipment. Cable consists of an 11-pin chassis receptacle that mates with the test set plug and is terminated on the other end with a 12-pin miniature plug.

TKN-6025A	Adapter Cable

Audio Adapter

I Adapts the TKN-6025A MOTRAC radio metering adapter plug to the Motorola Test Set to make power output checks and audio stage gain measurements on MOTRAC radio receivers. Shipping weight—¼ lb.

TEK-11	Audio Adapter

RF Cable Adapter

J Properly couples the output of the signal generator directly to the RF stages in transistorized receivers for making stage gain measurements. Shipping weight—¼ lb.

TEK-10	Cable Adapter

Metering Socket Transmit Adapter

K The TEK-18 Adapter enables the technician to operate the transmitter directly from the metering sockets of the transmitter. It eliminates the inconveniences of switching the test set from transmitter to receiver when making receiver adjustments. Shipping weight—¼ lb.

TEK-18	Adapter

Audio Voltmeter Adapter

L The Audio Voltmeter Adapter permits separate use of the audio voltmeter portion of recent Motorola test sets. Shipping weight—¼ lb.

TEK-12	Audio Voltmeter Adapter

Microwave RF Adapter

M BNC to photo RF adapter connector. Required for trouble shooting STAR-POINT RF Station.

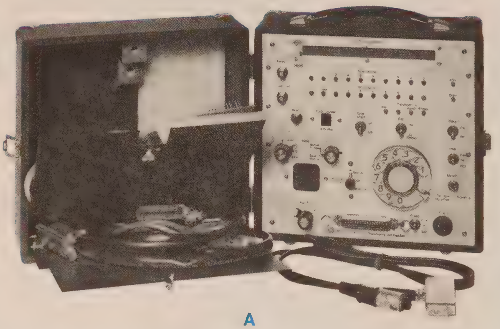
RSX-4021A	Adapter

MAXAR Radio Test Cables

N Metering cables and adaptor for testing MAXAR Radios with S-1056 series test sets and TEK-5 Metering Panel.

SKN-6029A	Metering Cable for use with TEK-5 Metering Panel.
SKN-6030A	Metering Cable for use with S-1056 series test set.
RPX-4028A	Adaptor for use with SKN-6029A and -6030A to test 30/25 w high performance MAXAR Radio.

Radiotelephone Test Equipment



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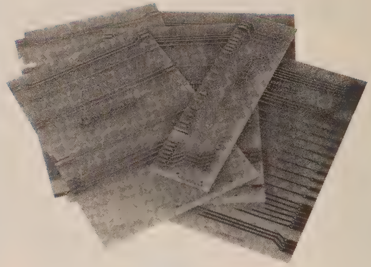

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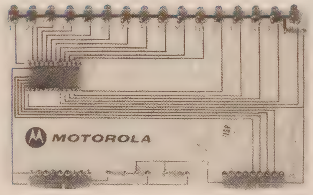
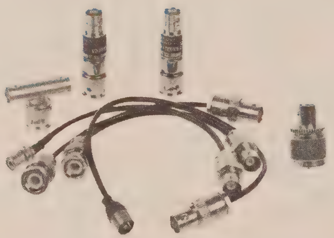


Channel Indicator Board



RF Cable Kit

Attenuator Kit

C

Supervisory Test Set

• Pulse and digit count indicators • Automatic-manual operation • Five oscillators and output amplifier • Tone detector circuits • Timer circuit • Audio mute test

A The S-1336B Supervisory Unit Test Set provides facilities for servicing the VHF PULSAR Radio Supervisory Units (TLN-5252A and TLN-5254A) as well as the older units (TLN-1034, TLN-1442 and TLN-1443). An adapter kit (SLN-1016A) is included to provide for servicing the UHF PULSAR Radio Supervisory Boards (TRN-6504A and TRN-6505A).

It simulates both transmit and receive functions of the base station providing a complete checkout of all supervisory unit circuitry.

The test set is housed in a convenient carry case with a removable front cover. A power cord and test cable are stored under a hinged plate in the front cover. The unit may be powered from 117V ac or 12V dc.

All indicators are long life LED's (light emitting diodes). A digital numeric readout labelled "pulse counter" is provided for indicating dialed digits from supervisory units. A panel mounted receptacle permits inserting the supervisory board directly into the test set for fast, efficient testing.

Tones for IMTS, MTS, and 2850 Hz systems are also provided.

BNC connectors are provided for connecting the test set to audio input and output circuits on test equipment. This feature allows for complete "off-the-air" system checks when using a device such as a service monitor in conjunction with the test set.

S-1336B	Supervisory Test Set
SLN-1016A	Adapter Kit for UHF PULSAR Radio Supervisory Board. Includes SLN-6444A Adapter Board and SKN-6042A Adapter Cable. This kit is supplied as part of current S-1336B models. The SLN-1016A should be ordered to equip existing S-1336A Test Sets for UHF Pulsar testing.

SPECIFICATIONS

Output frequencies: 2805-2000-1800-1500-600 Hz. **Output volts:** 1.0V into 600 ohms at 117V ac line input. **Operating temperature range:** −20°C (−4°F) to +60°C (140°F). **Input voltage:** 117 volts ±10%, 60 Hz ac or 13 volts dc ±10%. **Power required:** AC operation — 5.5 watts, Battery operation — 3.5 watts.

Extender Circuit Board Kit

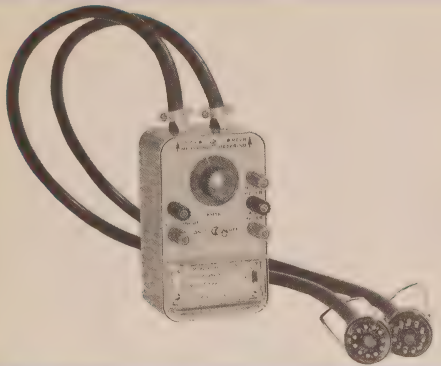
B This kit contains seven extender boards required for servicing PC boards in VHF PULSAR Mobile Telephone Radios. Individual boards may be ordered separately.

RTX-1002A	Extender Board kit includes the following:
RTL-4023A	Supervisory Board Extender
RTL-4024A	IF Board Extender
RTL-4025A	Audio Board Extender
RTL-4026A	Interface Extender
RTL-4027A	TX Logic Extender
RTL-4028A	RX Logic Extender
RTL-4029A	Channel Display Board for adapting RTX-4002 UHF channel indicator board for VHF.

PULSAR Radio Service Aids

C Service Aids for UHF PULSAR Radio consists of:

RTX-4002A	Channel Indicator Board
RPX-4001A	RF Cable Kit
58-80322A17	Attenuator Kit (replaces RTL-4006A)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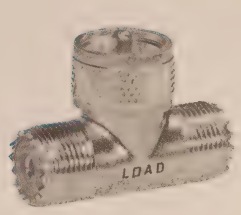

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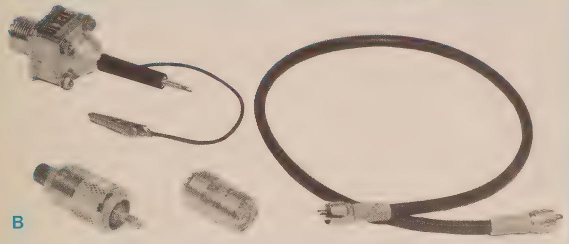
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D

Radio Test Adapter Kit

A Basically, this adapter kit permits use of the standard radio test set (P-8501, TU-546, S-1056A to S-1059A series) with the MTS/IMTS radio. The following functions are provided by this adapter kit.

• Provides cables for connecting the test sets to metering receptacles on all MTS/IMTS Radios. • Provides jacks on the kit to permit use of either the Western Electric 3A Noise Measurement meter with 3 kHz flat weighing or an AC voltmeter (Motorola S-1053) (roll-off network incorporated in kit) for quieting sensitivity measurements • Permits use of radio test set speaker for monitoring by means of a built-in amplifier.

TEN-6055A Radio Test Adapter Kit (Replaces TEKA-41 & TKN-6143A)

Radio Alignment Kit

B Provides necessary cabling and connectors required for duplex and receiver alignment. Includes TEK-10 for properly coupling the output of an FM Signal Generator to the r-f stages in the receiver for making stage gain measurements.

TEN-6054B Radio Alignment Kit.

Radio Duplex Sensitivity Measurement Adapter

C Enables measurement of receiver sensitivity with duplex operation (with transmitter "on".) This is a coaxial T connector with a built-in attenuation arrangement to protect the signal generator from transmitter power output.

TEN-6056A Radio Duplex Sensitivity Measurement Adapter.

Tone Signalling Test Set

D The Motorola SLN-6414A Tone Signalling Test Set is designed to accommodate the testing and troubleshooting of communication systems addressable by DTMF (Dual Tone Multi Frequency) signalling. These include the Micor System 90 and various SP Base Station systems.

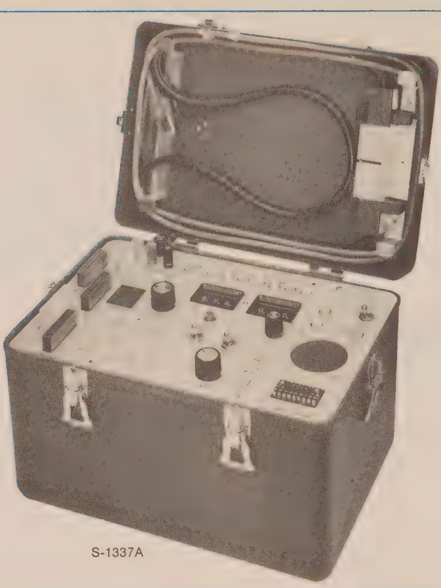
The SLN-6414A is a self-contained unit consisting of:

1. A standard telephone DTMF pad capable of generating any two tone sequence for system addressing.
2. Standard telephone hand set used for two way voice communication as well as monitoring the incoming and outgoing DTMF tones.
3. Input line compression amplifier with sensitivity and separate earpiece volume adjustment to facilitate reliable external tone decoding as well as proper voice listening level. The input line is DC isolated and 600 ohms terminated.
4. Output line compression amplifier with output level adjustment ranging from −30db to +10db across 600 ohms DC isolated output line.
5. Built-in provision including power for an auxiliary (external) DTMF decoder. Visual and audible indication is provided when the desired two tone sequence address is decoded.

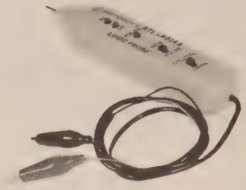
This versatile tester is invaluable for field systems troubleshooting since it can be used to simulate an encoder and provide two-way voice communication.

Two connector sockets located on the back of the housing provide the interface to and from the test set. The four pin socket provides tone and voice input/output connection, and the five pin socket provides connection to and from the DTMF decoder when used.

SLN-6414A	Tone Signalling Test Set
SKN-6034A	Tone and Voice Input/Output Interface Cable terminated in phone plugs. (same as 1-80300A39)
SKN-6035A	Tone and Voice Input/Output Interface Cable terminated in alligator clips. (same as 1-80300A40)
SKN-6033A	External decoder interface cable terminated in multipin connector. (same as 1-80300A12)



S-1337A



RTL-4014A

MODAT Mobile Data System Test Set

The S-1337A Test Set is designed to test the MODAT Mobile Data System encoder/decoder logic system. Six digital thumbwheels are provided to quickly set up the receive and send, time-slot codes for the unit under test.

The front panel has five color coded sockets for fast identification when testing the various boards in the Test Set.

An interconnect cable is provided for connection to the encoder/decoder for inserting the ID/call and data input boards for in-shop maintenance.

The test set can be operated directly in a vehicle from the 12 volt battery or alternately a 117V ac power supply is provided to perform "in-shop" tests. Standard ¾" spaced connectors are provided for connection to the 12 volt vehicle system.

The front panel includes a seven segment LED (Light Emitting Diode) type indicator which shows the frequency number of the information inputted to the test set from the various modules when the test set is in the decode mode or, when in the encode mode, the frequency number of the data that the test set is sending to the MODAT Data Unit logic system.

Pushbutton switches are used to test the various modes of unit operation such as push to talk, hang-up test, call driver, and emergency. Proper operation is shown on the indicator lamps as the functions are initiated and performed.

This unit provides the technician with the needed circuitry to "stop" the clock and manually advance it in sequence one step at a time in the signal circuits of the MODAT Data Unit.

A front panel BNC receptacle provides operating power for logic probe RTL-4014A when used with the BNC adapter (Order Separately).

S-1337A	Test Set, Modat ID encoder/decoder
RTL-4014A	Logic Probe
IV80303A01	BNC Adapter

Logic Probes

For DTL, TTL, CMOS logic—Mobile Data Systems, Teleprinter, and other digital circuits.

Can be used with the MODAT Mobile Data System Test Set (S-1337A), Logic Probe RTL-4014A will detect and indicate logic levels and the presence and polarity of single pulses of very short duration. Operating power is obtained directly from the front panel of the test set using optional BNC adapter. Indicator lamps on the probe provide an immediate visual indication of the condition existing in the circuit under test for step by step logic state testing. The probe can also be used to service other DTL, TTL or CMOS logic circuits independently of the test set. Simply connect to a 5V source and ground on the board being tested.

RTL-4014A DTL, TTL, CMOS Logic Probe.

SPECIFICATIONS

Input Impedance: 100,000 ohms. **Thresholds** (Switch Selectable): DTL-TTL, HTL-CMOS; Logic 1 Thresholds (HI-LED), 2.25V±.015V, 70% Vcc; 30% Vcc. **Min. Detectable Pulse Width:** 50 Logic 0 Thresholds (LO-LED), 0.80V±.010V, nanoseconds. **Max. Input Signal Frequency:** > 10 MHz. **Pulse Detector (Pulse LED)** (Switch Selectable): High Speed pulse train or single events (+ or − transitions) activate 1/3 second pulse stretcher. **Pulse Memory (Pulse LED)** (Switch Selectable): Pulse or Level transition detected and stored until reset. **Input Overload Protection:** ±50V continuous 117VAC for less than 15 seconds. **Power Requirements:** 5 Volt Vcc, 30 Ma; 15 Volt Vcc, 40 Ma; 36 volts max. with power lead reversal protection. **Operating Temperature:** 0° to 50° C. **Physical Size L x W x D:** 5.8 x 1.0 x 0.7" (147 x 25,4 x 17.8mm).

Input
Output
Bat
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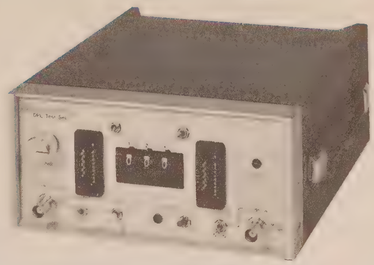
3
Test
Meter Adj
MOTOROLA
Reed Tester
SLN 6222B

A



B

Transistorized Reed Tester

Battery Operation

A The SLN-6222B Reed Tester provides a convenient and accurate method of checking and testing a variety of VIBRASPONDER resonant reeds found in Motorola 2-way radio equipment.

Provisions are made to test the standard 4-prong series and also the miniature 6-prong and 4-prong reeds.

Compact and versatile, the tester provides the facility for checking reed sensitivity, contact dwell, insertion loss, and other tests.

It has provisions for monitoring input and output levels and waveforms and allows measurement of contact dwell with a standard test set meter.

The S-1067A Audio oscillator or the TEK-34 Reed Controlled Tone Generator can be used to provide the driving voltage when making these tests.

Completely solid state circuitry is provided for testing the latest "contactless" type reeds quickly and accurately. Reed efficiency or insertion loss is shown by an indicator light.

SLN-6222B	Reed Tester with Battery
60-863919	Replacement 6.5 volt battery (1 req.)

Channel Element Surface Thermometer

Especially selected for use in servicing 450-470 MHz base stations. This special surface thermometer is a must for setting frequency offsets in relation to temperature when using the calibration charts incorporated in the base station instruction manuals.

Two permanent magnets hold the exposed temperature sensing element directly against the channel element for accurate temperature measurements.

ST-708 Channel Element Surface Thermometer

Extender Boards

Can't get at the measuring points in plug-in pc boards? You can with an extender board. This service aid extends the pc card for servicing without disabling it. 1-866854, 1-866855, and 1-866856 fit standard 10-, 15-, and 22-pin connectors.

The TLN-8799A extender card is a must for servicing remote control base stations and community repeaters. Order several so you can check more than one board at the same time.

MODEL NO.	USED WITH
TLN-5158A	MODAT Base Stations
TLN-5370A	Remote Consoles
TLN-8799A	DC and tone remote control base stations
1-866856	22-pin for S-1327 series Service Monitor and S-1075 series Digital Frequency Meter
1-866855	15-pin for S-1075 series Digital Frequency Meter
1-866854	10-pin for S-1075 series Digital Frequency Meter. All three required for servicing of complete unit.
1-80788A15	L08 series high capacity paging encoders
SLN-6176A	S/40 and S/41 CCTV camera

Digital Private-Line Test Set

B This Test Set is required for testing and troubleshooting "Digital Private-Line" squelch. It contains a separate "Digital Private-Line" encoder and decoder, and both may be used simultaneously if necessary. Thumbwheels on the front panel allow any possible code word to be programmed into the test set. In addition, separate code plug sockets are provided for both encoder and decoder sections of the test set so code plugs may be used to program the code word into the test test.

The test set can be used for both signal substitution and signal tracing methods of troubleshooting. The encoder generates any possible "Digital Private-Line" code word for injection into the equipment being tested. A PTT switch on the test set places the encoder in the transmit mode whenever desired, and the encoder can be locked in the transmit mode for continuous code generation. A level control adjusts the output signal level.

The decoder gives a visual indication if the point of measurement contains the proper word signal, and can thus be used for many signal tracing measurements.

Front panel switches allow the encoder output signal and decoder input signal to be inverted, if necessary, to match the signal polarity required by the equipment under test.

SLN-6413A Digital PL Test Set

SPECIFICATIONS

ENCODER: Output level: 0-3V pp into 600 ohms. **Output imp:** approximately 100 ohms. **Output code:** 000 to 777 octal. **Code generation:** thumbwheel switch or code plug with polarity inversion.

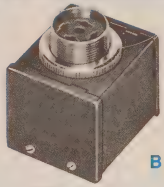
DECODER: Input sensitivity: 25 mv pp. **Input frequency response:** 10db per octave roll off above 140 Hz. **Input code:** 000 to 777 octal. **Code comparison:** against thumbwheel switch or code plug with polarity inversion capability. **Decode detect light:** when input code matches code plug or thumbwheel switch.

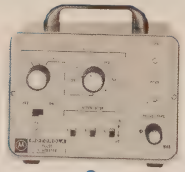
GENERAL: Power: AC: 115/230 VAC 50-60 Hz; DC: 10.8-15 VDC. **Size:** 8W x 4⅛H x 9½D. **Weight:** less than 3 lbs.

DPL Turnoff Code Test Option

An option to the SLN-6413A "Digital Private Line" test set. Its purpose is to enable technicians to check the proper operation of the turn-off code in the DPL squelch system. This option allows the RF signal from a generator to be maintained for 200 ms after PTT on the test set is released. The technician may then monitor the squelch operation within the receiver.

TEKA-106 PTT Delay





E
1-84201D65
TEKA-81

Microphone Test Set

A The ST-855 Tester provides a complete audio power amplifier, tone oscillator and AC Volt Meter. Any microphone can be tested simply by plugging it into the unit. The internal 1000Hz oscillator and the built-in AC Volt Meter allows the mic. output level to be checked. The selector switch allows for using the amplifier and speaker to monitor the audio coming through the microphone.

ST-855A	Microphone Tester
ST-868	Adapter for Spade Lug Terminals
TEKA-74	MICOR to 4-prong Mic. Receptacle
TEKA-77	HT-220 Remote Mic. Adapter
TEKA-79	HT-220 Uni. Mic. Adapter

Microphone Tester

B The TEK-19 is used in conjunction with the Motorola test set to show relative output of plug-in type carbon or transistorized microphones and handsets. Microphones with spade lugs can be tested with this unit by using it in combination with the TEK-12 adapter. The TEK-12 consists of a microphone plug with 2 clip leads which can be connected directly to the control head terminal board. Shipping weights: TEK-19—¼ lb., TEK-12—¼ lb.

TEK-19	Microphone Tester
TEK-12	Adapter
TEKA-74	MICOR to 4-prong Mic. Receptacle
TEKA-77	HT-220 Remote Mic. Adapter
TEKA-79	HT-220 Uni. Mic. Adapter

Pulse Generator

Battery Operation

C Here is a unique new piece of equipment especially designed for the servicing of EXTENDER circuits . . . a must for MICOR Hi Band EXTENDER receivers as well as all other low band EXTENDER models. The TEK-47 provides the necessary degradation of 50 dB in a compact, portable unit comparable to non-portable, laboratory type, pulse generators costing many times as much. The TEK-47 Pulse Generator provides an output that simulates ignition or impulse noise pulses. It eliminates the need for checking the noise circuits of a mobile radio while installed in the vehicle.

The pulse generator produces with a very fast rise time of 0.6 nanoseconds and an adjustable peak-to-peak amplitude of up to three volts (approximately). The unit provides two fixed pulse rates of 10 kHz, and 40 kHz, and a variable pulse rate adjustable between 10 kHz and 150 kHz. The unit is completely transistorized and obtains its operating power from two 67.5 volt batteries. It includes a built-in 6 dB three-way pad to combine the pulse generator output with the output from an external signal generator.

TEK-47	Pulse Generator

Pulse Generator

Battery Operation

D Developed specifically for servicing Motorola 2-way radios equipped with EXTENDER operation, the TEK-21 combines versatility with outstanding accuracy and economy.

The TEK-21 has output levels permitting receiver degradation of up to 50 db, much higher than normally would be encountered in a malfunctioning unit.

When used in conjunction with the TEK-1A Transistorized Tone Oscillator, the TEK-21 permits complete noise balancing on the service bench rather than confining this type of maintenance to the radio-equipped vehicle. Shipping weight —2 lbs.

TEK-21	Pulse Generator w/Cable
60-863919	Spare Battery (2 used)

Channel Scan Tester

E The TEK-42 CHANNEL SCAN Tester provides an interface between the power and noise sources and the scan monitor. It can be used to check the T-1156A, T-1157A and T-1158A scan monitors, and the TLN-1387A and the TLN-1388A CHANNEL SCANS by using the appropriate cabling. Eliminates the need for a complete mobile installation. Additional equipment necessary for use with the TEK-42 tester are a power supply (Motorola S-1347A or S-1348A) and a tone oscillator (Motorola S-1067A).

The TEK-42 can also be used to check some of the special versions of the T-1150 series monitors used on radios equipped with PRIVATE-LINE Tone Coded Squelch provided the special scan monitor uses standard input and output intercabling. The "PL" switch on the tester provides the switch input as from a control head. Order optional adaptor cable for MICOR radio separately.

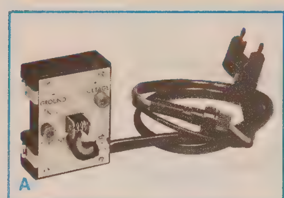
TEK-42	Channel Scan Tester (includes connector cable 1-84201D65 for MOTRAC and MOTRAN radios)
TEKA-81	Adapter cable (optional for MICOR radios)

The Parts Department
of the Motorola Communications Group

Area Offices

Eight Parts Department Area Offices located strategically throughout the United States insure prompt attention to the needs of both large and small U.S. customers. Additional offices are located throughout the world to serve the needs of international customers.

MT 500 Series HANDIE-TALKIE Radio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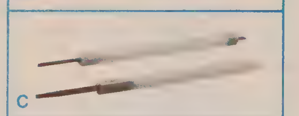
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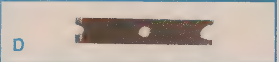
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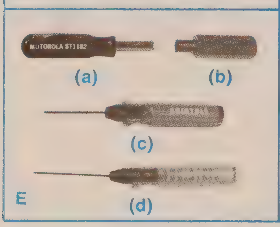

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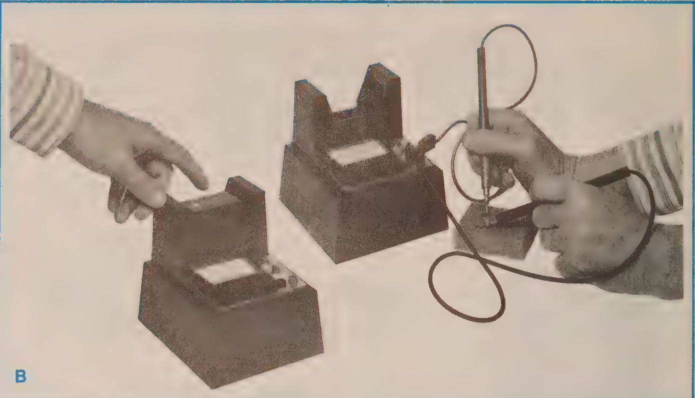
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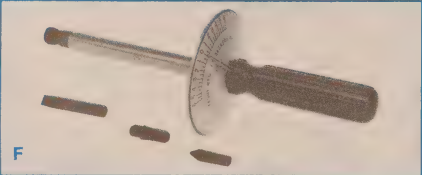
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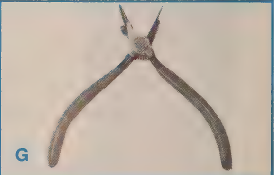
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Dummy Battery Kit

A Dummy Battery Kit allows an external power source to be used for servicing the radio in place of the battery. Also provides convenient test jacks for measuring input voltage and current with a Motorola Solid-State dc Multimeter. Unit can also be used with HT-220 radio.

TEK-44	Dummy Battery Kit

Battery Tester

B Battery Tester allows you to check nickel-cadmium batteries either in or out of the radio (MT 500 and HT-220). Mercury and alkaline batteries must be removed from the radio for testing. Also, in radios with diode protection in the charging contacts, nickel-cadmium batteries must be removed for testing. Expanded range voltmeter indicates battery voltage . . . less than 11 volts for nickel-cadmium batteries or less than 10 volts for mercury batteries indicates marginal operation and the battery should be recharged or replaced. Expanded range, from 9½ to 17½ volts, provides extra high resolution for easy reading.

Both high and low current loads allow you to check any type of battery under load by simply pushing a button. Alternately, nickel-cadmium batteries in the radio may be tested under load by keying the transmitter. Two test lead jacks are available for testing batteries out of the radio. (Order test leads separately.)

TEK-48	Battery Tester
TEKA-82	Test Leads for TEK-48 Battery Tester

Tuning Tool Kit

C Consists of one 66-05607E01 Tuning Tool for channel elements and tunable coils; and one 66-05599E01 Tuning Tool for preselector tuning and other servicing needs.

NLN-4605A	Tuning Tool Kit

Service Tool Kit

D This service tool is used to remove all spanner type units, including the collapsible antenna.

55-5717E01	Service Tool Kit (replaces NLN-4606A)

Wrenches

E A number of additional special wrenches are available for convenience in servicing the MT 500 series radio.

(a) ST-1182	Removes speaker jacks and battery latch. (Xcelite TW32) NOTE: Service Tool 55-05717E01 also accomplishes these functions.
(b) ST-635	Removes volume, squelch, frequency select switch, PL switch and Universal model push-to-talk feedthrough assembly. (Xcelite TW140) NOTE: Service Tool 55-05717E01 also accomplishes these functions.
(c) ST-1183	Used on volume, squelch, frequency select switch, PL switch, and power amplifier mounting nuts. (Bristol DS 060) NOTE: Service Tool 66-05599E01 also accomplishes these functions.
(d) RSX-4011A	Used for preselector tuning and power amplifier mounting set screw. (Bristol DS 048) NOTE: Service Tool 66-05599E01 also accomplishes these functions.

Torque Screwdriver

F This tool is required to apply the proper torque to transceiver hold down screws (1 inch pound) and to the power amplifier hold down screw (4-4.5 inch pounds). Torque is clearly shown on dial indicator. Also used on PT-500 radio.

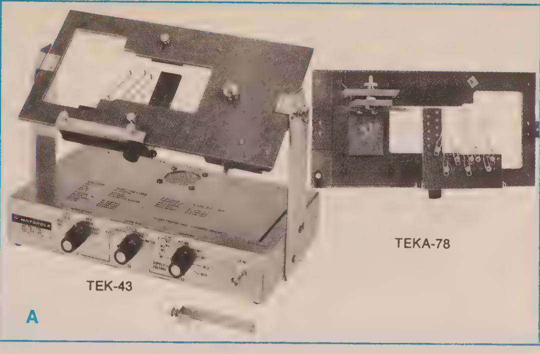
RSX-4030A	Torque Screwdriver

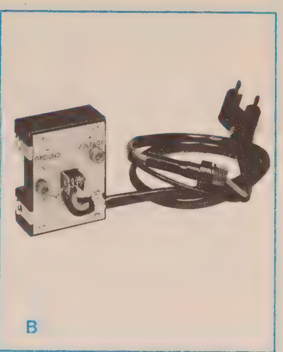
Restriking Tool

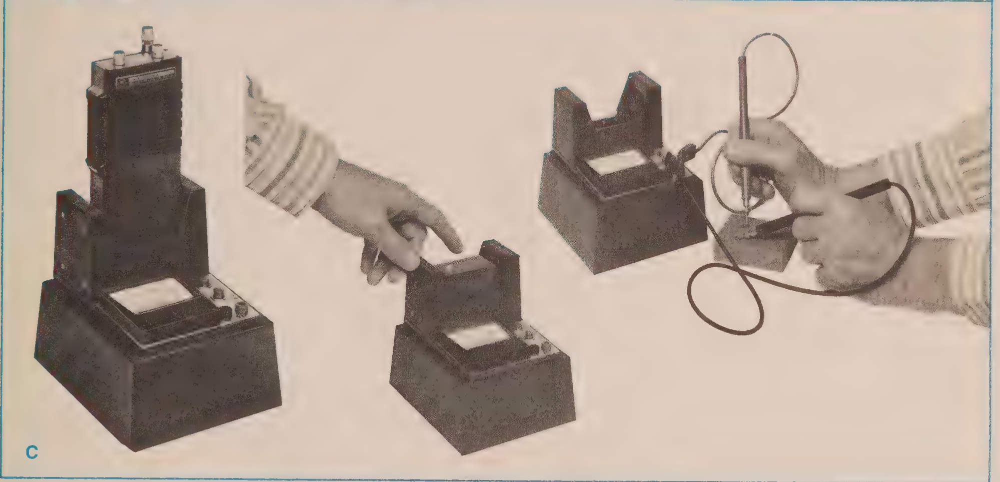
G This hand tool is designed to replace the "bow" in channel element pins to insure proper connection with the radio circuit board. Also used on PT-500 radio.

RSX-4031A	Restriking Tool

HT-220 HANDIE-TALKIE Radio







HT-220 Test Fixture

A This unique universal test fixture is an invaluable service aid for complete service setups on both omni and slimline HANDIE-TALKIE Radios. The TEK-43 provides total metering facilities to allow rapid connection to the various metering points on the circuit board. A built-in speaker allows the radio to be operated with both front and rear covers removed. Other features include adjustable probes for precise placement, automatic keying, and test jacks for monitoring the dc power supply and radio metering points. Speaker loads are selectable by panel switches for maximum versatility. The phenolic holding frame is durable and can be locked in any position to permit easy removal of components. The holding frame can be unplugged for fast change out from one radio to another using spare frames.

TEK-43	Complete Test Fixture with metering switch selection
TEKA-78	Spare holding frame for TEK-43

HT-220 Dummy Battery Kit

B The TEK-44 Dummy Battery Kit allows an external power source to be used for servicing the HT-220 HANDIE-TALKIE Radio in place of the battery. The kit also provides convenient test jacks for measuring input voltage and current with a Motorola Solid-State dc Multimeter.

TEK-44	HT-220 Dummy Battery Kit

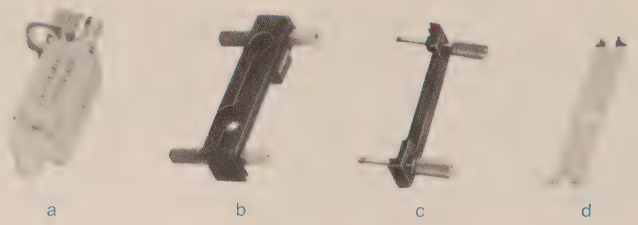
HT-220 Battery Tester

C The TEK-48 Battery Tester allows you to check HT-200 nickel-cadmium batteries either in or out of the radio. Mercury and alkaline batteries must be removed from the radio for testing. **Also, in newer model radios with diode protection in the charging contacts, nickel-cadmium batteries must be removed for testing.** Expanded range voltmeter indicates battery voltage . . . less than 11 volts for nickel-cadmium batteries or less than 10 volts for mercury batteries indicates marginal operation and the battery should be recharged or replaced. Expanded range, from 9½ to 17½ volts, provides extra high resolution for easy reading.

Both high and low current loads allows you to check any type of HT-220 battery under load by simply pushing a button. Alternately, nickel-cadmium batteries in the radio may be tested under load by keying the transmitter. Two test lead jacks are available for testing mercury batteries. (Order test leads separately.)

TEK-48	HT-200 Battery Tester
TEKA-82	Test Leads for TEK-48 Battery Tester

HT-220 HANDIE-TALKIE Radio



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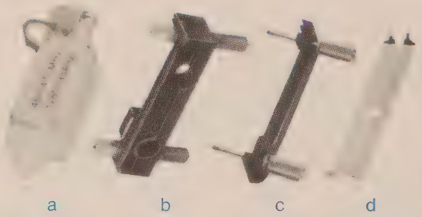

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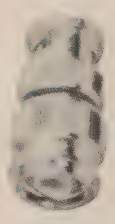

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Tune-Up Adaptor Kits

Antenna Adaptors

These adaptors are used to properly match the antenna impedance of the radio to 50 ohms. Each adaptor is designed for a specific frequency band and is terminated in a BNC connector.

Housing Adaptors

These adaptors allow electrical connection to the antenna (1-80700C67 and 1-80791A42) and are used to connect the sleeve on the omnihousing to the main frame (1-80791A43) when the back cover of the radio is removed.

Antenna/Control Wrench

This wrench is used to remove the antenna and can also be used to remove the nuts on the squelch and volume control pots.

A HT-220 VHF Tune-Up Adaptor Kit

Includes:*

(a) **1-80793A93** Antenna Adaptor
(b) **1-80791A42** Housing Adaptor
(c) **1-80791A43** Housing Adaptor
(d) **55-84777H01** Antenna/Control Wrench

NKD-6001B Adaptor Kit

B HT-220 UHF Tune-Up Adaptor Kit

(See 9-5544A01)

Includes:*

(a) **1-80793A92** Antenna Adaptor
(b) **1-80791A42** Housing Adaptor
(c) **1-80791A43** Housing Adaptor
(d) **55-84777H01** Antenna/Control Wrench

NKE-6003A Adaptor Kit

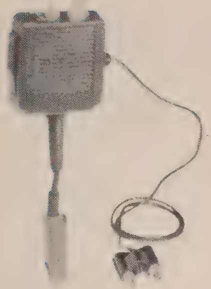
C HT-220 Public Safety Model Antenna Adaptor Kit UHF

Includes:*

9-5544A01 Adaptor Kit (Same as NLN-8417A)

Note: HT-220 (H34FFN Series Radios) 470-512MH2—NKE-6009A Adapter Kit IV05955B15 Antenna Adapter used exclusively with NUE-6003DC, NUE-6003AA, NUE-6004CC or NUE-6004CD Chassis and for "SP" Radios mod. for 470 to 512 MHz oper. (The NKD-6001B and NKE-6003A Kits are not compatible with these radios.)

Adaptors listed above may also be ordered separately.



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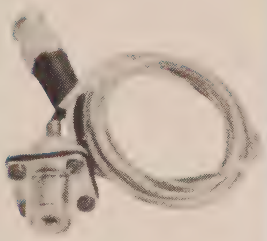

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F

Remote Speaker/ Microphone Tune-Up Cable

A This tune-up cable is used for aligning the remote speaker/microphone 450-470 MHz HT series radio.

NKE-6007A	Remote Speaker/Microphone Tune-up Cable

Adaptor Cable

B The NKN-6065A Adaptor Cable is supplied with a female receptacle and a miniature plug. It is used to connect the HT-200, HT-220 or PAGECOM Pager to signal generator.

NKN-6065A	Adaptor Cable

HT-220 Microphone Adaptor

C Use this adaptor to convert the HT-220 remote microphone to standard four-conductor receptacle.

TEKA-77	HT-220 Remote Microphone Adaptor
TEKA-79	HT-220 Universal Microphone Adaptor

Cable and Connector Assembly

D This assembly when used with the appropriate antenna adaptor allows a direct connection to a signal generator or mobile antenna (BNC to PL259 UHF).

1-80794A48	Cable and Connector Assembly.

HT Tools

E Especially designed for the H21, H23-DCN and DEN and the HT-200 and 220 series HANDIE-TALKIE Radios, these special tools are ideal for removing the slotted knurled nuts used on the volume and squelch controls and the phone receptacles.

ST-635	with Recess (O.D. .3125″—I.D. .240″) For volume and squelch controls.
ST-1182	with Recess (O.D. .250″—I.D. .173″) For antenna and speaker jacks.

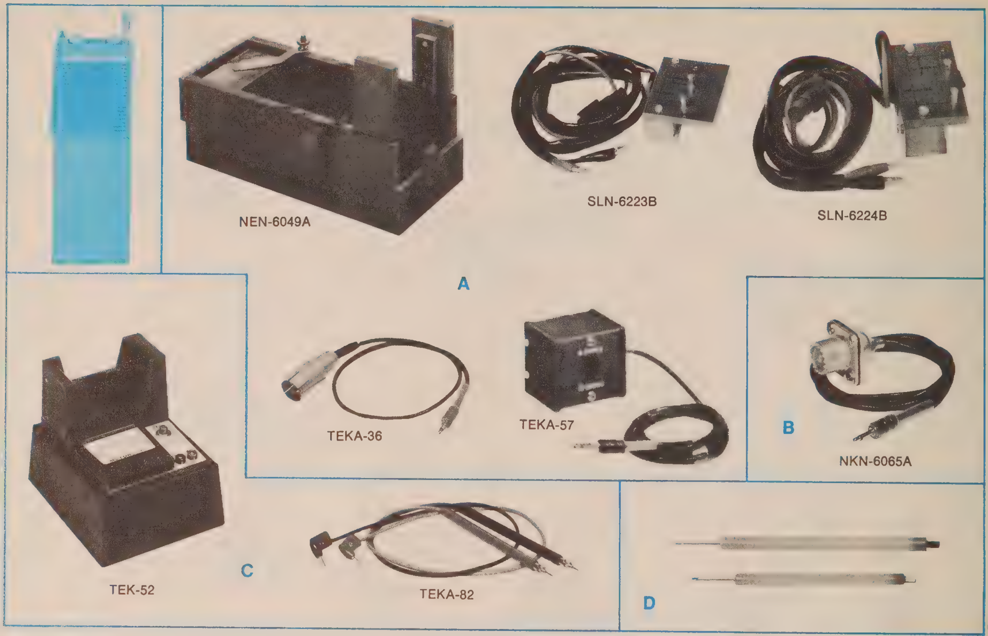
HT-220 & HT-100 Alignment Tool Kit

F Includes: 66-82186E01—One end has ¹⁄₁₆″ metal screwdriver blade; other end ⅛″ metal screwdriver blade; length, 5⅛″; 66-83034A01—One end has ¼″ screwdriver blade; other end has ¹⁄₁₆″ screwdriver blade; length, 6″.

NLN-6689A	HT-220 & HT-100 Alignment Tool Kit

Alignment tools may also be ordered separately.

HT-200 HANDIE-TALKIE Radio



HT-200 Test Fixture for H21, 23, 24 DCN and DEN Series

A The test fixture provides a convenient cradle to hold the HT-200 HANDIE-TALKIE Radio when making alignment or repairs.

Dummy battery blocks with leads are available as optional items for connection to an external DC power source. A pressed-in diode provides protection against polarity reversal.

RF and audio test cables are available and should be ordered separately. The RF cable (TEKA-36) consists of 18″ of RG58-U and terminates in a miniature phone plug on one end and a "quick-change" male connector on the other. This provides fast, easy connections when using the cable with either a signal generator for receiver alignment or a wattmeter for transmitter power output measurement.

The audio adaptor cable (TEKA-57) permits reading audio output on the test set AC voltmeter, and is ideal for making 20 dB quieting checks. Consists of a 20 pin plug with a slide switch for selection of the proper speaker matching resistor (8 or 15 ohms) and is terminated in a miniature phone plug for connection to the radio. Designed to plug into the TU-546 or S-1056A to S-1059A series test sets. Also ideal for use with HO3BNC series VHF pager.

NEN-6049A	Test Fixture
SLN-6223B	Dummy Battery Block and Cable for Standard HT-200 Series Radio, using a 16.8 volt Mercury or 14.4 volt Nickel-Cadmium Battery
SLN-6224B	Dummy Battery Block and Cable for Hazardous Duty HT-200 Series Radio, using a 10.8 volt Mercury Battery
TEKA-36	RF Adaptor Cable
TEKA-57	Audio Adaptor Cable

Adaptor Cable

B Supplied with a female receptacle and a miniature plug. Used to connect the H21, H23DCN model to a mobile antenna or signal generator.

NKN-6065A	Adaptor Cable

HT-200 Battery Tester

C The TEK-52 Battery Tester allows you to check all HT-200 nickel-cadmium batteries either in or out of the radio. Mercury and alkaline batteries must be removed from the radio for testing. External test leads are available for this purpose. An expanded range voltmeter indicates battery voltage at load or no load conditions. Both high and low current loads enable checking of any recommended type of HT-200 battery under load simply by pushing a button.

NOTE: Due to the low battery voltage, the TEK-52 Battery Tester cannot be used with the hazardous duty HT-200.

TEK-52	HT-200 Battery Tester
TEKA-82	Test Leads for TEK-52 Battery Tester

Alignment Tools and Kits

D Alignment tool kit for H21DCN low band and H23DCN high band HT-200 Series radios. Includes: 66-82186E01 and 66-835717 (replaces 66-850443).

NLN-6252A	Alignment Tool Kit

Alignment tool kit for H24DCN 450 band HT-200 Series radios. (Includes: 66-82186O1 & 66-83137CO1)

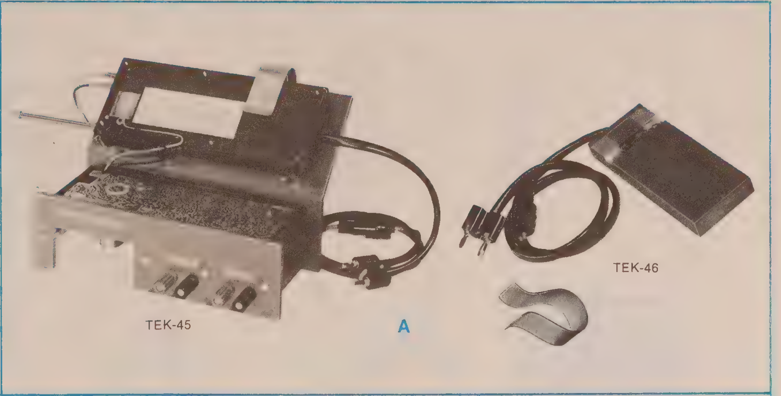
NLN-6470A	Alignment Tool Kit

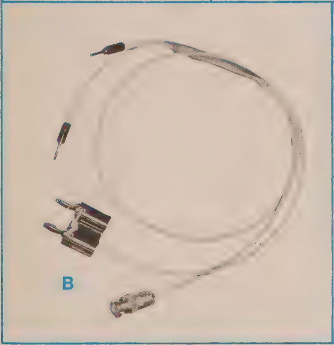
Alignment tool kit for H23DEN high band HT-200 Series radios. (Same as NLN-6245A)

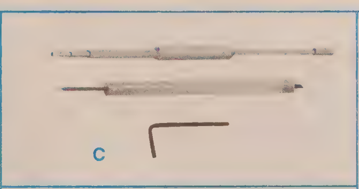
66-82186E01	Alignment Tool Kit

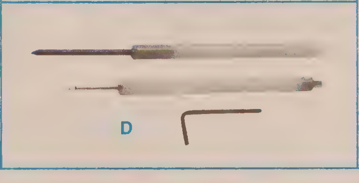
Alignment tools may also be ordered separately.

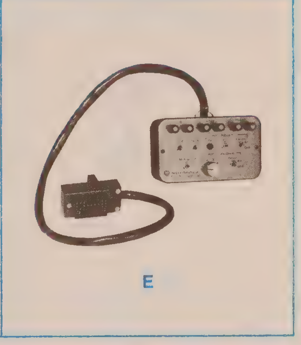
HANDIE-COM Radio











HANDIE-COM Radio Test Fixture and Dummy Battery Block

A This text fixture provides a convenient cradle to hold the Motorola HANDIE-COM Radio for alignment and servicing. The fixture includes test jacks for RF input and audio monitoring, a keying device, and a built-in speaker for acoustically coupling an audio signal into the unit.

The dummy battery block provides a convenient means of connecting to a bench power supply and can be used with or without the fixture. It is supported with a spring clip to hold the block firmly against the battery contacts.

TEK-45	Test Fixture
42-84200D26	Replacement Spring Clip for TEK-45
TEK-46	Dummy Battery Block

Alignment tools may also be ordered separately.

Alignment Cable Kit

B Provides facility for connecting the RF signal generator to the antenna input. Also allows reading the audio output on an AC voltmeter.

NKN-6157A Alignment Cable Kit

Servicing Tools

C Alignment tool kit for H21TTN, low band HANDIE-COM MH-10 Series radios. Includes: 66-84387CO1 (replaces 66-84639BO1) hex tuning tool, 66-82186EO1 alignment tool, and 66-83006JO1 spline wrench (.06).

NLN-8008A Alignment Tool Kit

D Alignment tool kit for H23RRB, H23-RRU, H23TTB & H23TTU high band HANDIE-COM MH-70 and MH-10 Series Radios. Includes: 66-82186E01 alignment tool, 66-83034A01 alignment tool, and 66-83006J01 spline wrench (.06)

NLN-8418A Alignment Tool Kit

PAC•RT Test Set

E This Test Set simulates the control unit/vehicular charger and mobile controls. It enables the serviceman to test the PAC•RT vehicular repeater separate from the mobile radio.

S-1351 PAC•RT Test Set

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Tools and Test Equipment

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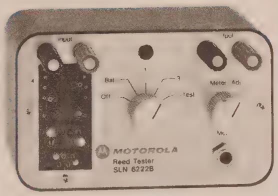

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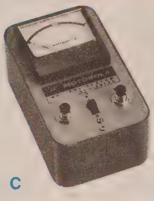

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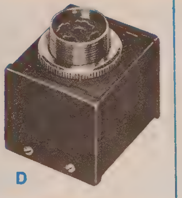

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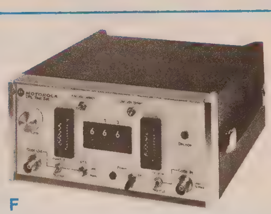

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Multiple Reed Tone Generator

A The Tek-55 Multiple Reed Tone Generator provides four (4) tone sources for all applications requiring high frequency stability. TLN-6824A VIBRASENDER Resonant Reeds are utilized, providing a frequency range from 67 to 3225 Hz. Oscillator frequency accuracy is ±0.1% in the range from 67 to 890 Hz and ±0.05% in the range from 890 to 3150 Hz. The adjustable output level is 3 V rms or greater into a 50 ohm load. Each oscillator circuit contains its own output level preset control. Output impedance is 18 ohms at 100 Hz. Hum and noise are −40 dB below 3 V rms and distortion is less than 3% at 3 V rms or greater with a 50 ohm load.

TEK-55	Multiple Reed Tone Generator

NOTE: VIBRASENDER Resonant Reeds supplied by Motorola crystal service department.

Transistorized Reed Tester

B The SLN-6222B Reed Tester provides a convenient and accurate method of checking and testing a variety of VIBRASPONDER Resonant Reeds found in Motorola 2-way radio equipment.

Provisions are made to test the standard 4-prong series and also the miniature 6-prong and 4-prong reeds used in the latest mobile and portable radio equipment. Compact and versatile, the tester provides the facility for checking reed sensitivity, contact dwell, insertion loss, and other tests. It has provisions for monitoring input and output levels and waveforms and allows measurement of contact dwell with a standard test set meter.

The S-1067A Audio Oscillator or the TEK-34 or 55 Reed Controlled Tone Generators can be used to provide the driving voltage when making these tests. Completely solid state circuitry is provided for testing the latest "contactless" type reeds quickly and accurately. Reed efficiency or insertion loss is shown by an indicator light.

SLN-6222B	Reed Tester with Battery
60-863919	Replacement 6.5 Volt Battery (1 req.)

Battery Testers

C The SLN-6213A Battery Tester plugs directly into the battery supplies of either high or low power units and will test the P21, 23, 31, 33 and 43DDC, DDN, DEN series providing instant indication of battery pack condition under actual load. Unit tests carbon-zinc, alkaline, and rechargeable nickel-cadmium batteries.

SLN-6213A	Battery Tester

NOTE: Carrying Case not available for SLN-6213A

Microphone Test Set

D The ST-855A Tester provides a complete audio power amplifier, tone oscillator and AC Volt Meter. Any microphone can be tested simply by plugging it into the unit. The internal 1000Hz oscillator and the built-in AC Volt Meter allows the mic. output level to be checked. The selector switch allows for using the amplifier and speaker to monitor the audio coming through the microphone.

ST-855A	Microphone Tester
TEKA-77	HT-220 Remote Mic. Adaptor
TEKA-79	HT-220 Universal Mic. Adaptor

Microphone Tester

E The TEK-19 is used in conjunction with the Motorola test set to show relative output of plug-in type carbon or transistorized microphones and handsets. Microphones with spade lugs can be tested with this unit by using it in combination with the TEK-12 adaptor. The TEK-12 consists of a microphone plug with 2 clip leads which can be connected directly to the control head terminal board. One 6.5 volt battery required (order separately).

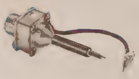
TEK-19	Microphone Tester
TEK-12	Adaptor (Not Shown)
TEKA-77	HT-220 Remote Mic. Adaptor
TEKA-79	HT-220 Universal Mic. Adaptor
60-863919	6.5 Volt Battery

"DIGITAL PRIVATE-LINE" Squelch Test Set

F This DPL Test Set is a specialized and highly proprietary test instrument designed to service mobile and portable DIGITAL PRIVATE-LINE options.

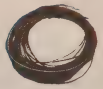
SLN-6413A	DPL Test Set

Portable Radio Tools



A

B



C

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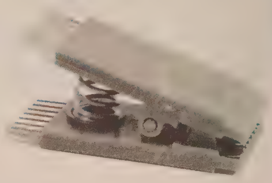
E



F

RF Cable Adaptor

A Properly couples the output of the signal generator directly to the RF stages in transistorized receivers for making stage gain measurements.

TEK-10 RF Cable Adaptor

Antenna/Control Wrench

B Used to remove the antenna and to remove nuts on squelch and volume control pots. ("HT-220" and "MX300" series Radios)

55-84777H01 Antenna/Control Wrench

Teflon Wire Kit

C An assortment of the most frequently used miniature wires found in pocket receivers, transmitters, etc. Wire supplied is special #26 gauge.

PDK-102 Teflon Wire Kit

Portable Radio Knob Kit

D Nearly 100 knobs, set screws, etc. for Motorola portable products in a convenient, 12-section, "see-thru" plastic box.

PDK-361 Portable Radio Knob Kit

"Handie-Talkie" Radio Tuning Tool Kit

E An assortment of 5 tuning tools for Motorola's Portable HANDIE-TALKIE Radio equipment. Consists of 66-835717, 66-847036, 66-83137C01, 66-82186E01, and 66-835721. With this assortment, you receive FREE a pocket protector and 5 pencil type clips.

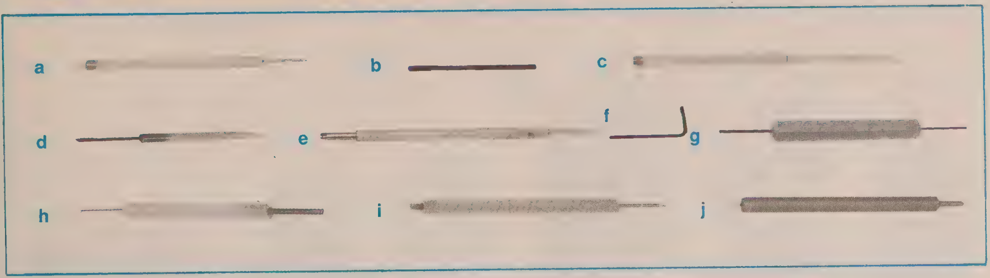
PDK-6610 Tuning Tool Kit

Dip-Clip

F The "Dip-Clip" is specially designed to allow the attachment of test probes to 14 or 16 lead DIPS (Dual In-Line Packages). The unique, patented design greatly reduces the possibility of accidental shorting while testing live circuits. Numerous test probes may be quickly connected for hands-free testing.

ST-1190 Dip-Clip

Alignment Tool Cross Reference Chart



TOOL	PART OF KIT NO.	MODEL USED ON
(Fig. a) 66-82186E01 Alignment Tool	NLN-6245A	P23DEN — PT Series H23DEN — HT-200
	NLN-6252A	H21 & H23DCN — HT-200
	NLN-6429A	P33 & P43DEN — PT Series
	NLN-6470A	H24DCN — HT-200
	NLN-6689A	H13FFN — HF-100 H23, H24 & H34FFN — HT-220 H33FFV — HT-220 CONVERTA-COM Radio
	NLN-8008A	H21TTN — HANDIE-COM
	NLN-8418A	H23RRB & RRU — HANDIE-COM H23TTB & TTU — HANDIE-COM H33RRB & RRU — HANDIE-COM
(Fig. b) 66-835717 Alignment Tool (Replaces 66-850443)	NLN-6252A	H23DCN — HT-200 H21DCN — HT-200
(Fig. c) 66-835721 Alignment Tool	NLN-6429A	P43DEN — PT Series P33DEN — PT Series
(Fig. d) 66-83034A01 Alignment Tool	NLN-6689A	H13FFN — HT-100 H23, H24 & H34FFN — HT-220 H24 & H34FFP — HT-220PSE Unit H33FFV — HT-220 CONVERTA-COM Radio (VHF) H34FFV — HT-220 CONVERTA-COM Radio (UHF)
	NLN-8418A	H23RRB — HANDIE-COM
(Fig. e) 66-84387C01 Alignment Tool (Replaces 66-83256C02)	NLN-8008A	H21TTN — HANDIE-COM
(Fig. f) 66-83006J01 Spline Wrench (.060)	NLN-8008A	H21TTN — HANDIE-COM
	NLN-8418A	H23RRB, TTB & TTU — HANDIE-COM H33RRB & RRU — HANDIE-COM
(Fig. g) 66-05599E01 Alignment Tool	NLN-4605A	PT500 — HANDIE-TALKIE MT500 Series — HANDIE-TALKIE
(Fig. h) 66-05607E01 Alignment Tool	NLN-4605A	PT500 — HANDIE-TALKIE MT500 Series — HANDIE-TALKIE
(Fig. i) Alignment Tool	ST-1181	MX300 Series — HANDIE-TALKIE
(Fig. j) 66-05699C01 Alignment Tool	ST-1179	MX300 Series — HANDIE-TALKIE

RADIO MODEL NUMBER SERIES	ALIGNMENT TOOL KIT	TOOLS
P23DEN — PT Series H23DEN — HT-200	NLN-6245A	66-82186E01 — Alignment Tool
H23DCN — HT-200 H21DCN — HT-200	NLN-6252A	66-82186E01 Alignment Tool 66-835717 Alignment Tool (Replaces 66-850443)
P33DEN — PT Series P43DEN — PT Series	NLN-6429A	66-835721 Alignment Tool 66-82186E01 Alignment Tool
H24DCN — HT-200	NLN-6470A	66-82186E01 — Alignment Tool
H13FFN — HT-100 H23FFN — HT-220 H24FFN — HT-220 H34FFN — HT-220 H24FFP — HT-220 PSE Unit H34FFP — HT-220 PSE Unit H33FFV — HT-220 CONVERTA-COM Radio (VHF) H34FFV — HT-220 CONVERTA-COM Radio (UHF)	NLN-6689A	66-82186E01 Alignment Tool (Metal) 66-83034A01 Alignment Tool
H21TTN — HANDIE-COM	NLN-8008A	66-84387C01 Alignment Tool (Replaces 66-83256C02) 66-82186E01 Alignment Tool 66-83006J01 Spline Wrench (.060)
H33RRU & RRB — HANDIE-COM H23RRB TTB & TTU — HANDIE-COM	NLN-8418A	66-82186E01 Alignment Tool 66-83034A01 Alignment Tool 66-83006J01 Spline Wrench (.060)
MX300 — HANDIE-TALKIE	NLN-8820A ST-1181 ST-1179	66-82186E01 Alignment Tool 66-05698C01 Alignment Tool 66-05699C01 Module Push Tool
MT500 — HANDIE-TALKIE PT500 — HANDIE-TALKIE	NLN-4605A	66-05607E01 Alignment Tool, Channel Elements & Coils 66-05599E01 Alignment Tool, Preselector

* Please order piece parts

Battery Cross Reference

MX 300
MX 320
MOTOROLA

Portable Radios

MT 500 Radios

NLN-4462	Use 60-05737E01
NLN-4463	Use 60-05741E01
NLN-6683A	Use 60-83582H01
NLN-6762A	Use 60-84342H01
NLN-6936A	Use 60-84815H01
NLN-8232A	Use 60-5295A03
60-05737E01	Nickel cadmium dual charge, slimline housing. (replaces NLN-4462)
60-05742E01	Nickel cadmium dual charge, omni housing. (replaces NLN-4463)
60-83582H01	Mercury, slimline (replaces NLN-6683)
60-84342H01	Mercury omni low power (replaces NLN-6762)
60-84815H01	Mercury omni high power (replaces NLN-6936)
60-5295A03	Nickel cadmium, omni-safe* (replaces NLN-8232)

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*FM Approval—Class I, Division I, Group C & D

MX 300 Radios

NLN-8833A	Use 60-5222C03
NLN-8834B	Use 60-5201E01
NLN-8835B	Use 60-5201E02
NLN-8838A	Use 60-5948D01
NLN-4002B	Use 60-5201E03
NLN-4891**	Use 60-5471F01**
NLN-8840***	Use 60-05452E01***
NLN-8841***	Use 60-05452E02***
NLN-8832	Use 60-5201E02
60-5222C03	Nickel cadmium ultra high capacity, charge time 7/14 HRS. (replaces NLN-8833A)
60-5201E01	Nickel cadmium medium capacity, charge time 1 HR. (replaces NLN-8834B)
60-5201E02	Nickel cadmium high capacity, charge time 1 HR. (replaces NLN-8835B and NLN-8832)
60-5201E03	Nickel cadmium light capacity, charge time 1 HR. (replaces NLN-4002B and 60-5224C03)
60-5452E01***	Nickel cadmium medium capacity, charge time 1 hr. (replaces NLN-8840***).
60-5452E02***	Nickel cadmium high capacity, charge time 1 hr. (replaces NLN-8841***).
60-5948D01	Primary mercury, non-rechargeable (replaces NLN-8838)
60-5471F01**	Nickel cadmium medium capacity, charge time 1 hr. (replaces NLN-4891)

**Canadian Standard Association (CSA)—Class I, Division I, Group A, B, C & D

***MESA (Mining Equipment Safety Association) approved models

HT 220 Radios

NLN-6682A	Use 60-84643H01
NLN-6683A	Use 60-83582H01
NLN-6761A	Use 60-84642H01
NLN-6762A	Use 60-84342H01
NLN-6899A	Use 60-84641H01
NLN-6900A	Use 60-84636H01
NLN-6936A	Use 60-84815H01
NLN-8232A	Use 60-5295A03
60-5295A03	Nickel cadmium (rapid-charge, omni-housing) for "intrinsically" safe radios. (replaces NLN-8232A)
60-83582H01	Mercury (slimline housing) (replaces NLN-6683A)
60-84342H01	Mercury (omni-housing, low power) (replaces NLN-6762A)
60-84636H01	Nickel cadmium (rapid-charge omni-housing) (replaces NLN-6900A)
60-84641H01	Nickel cadmium (rapid-charge slimline) (replaces NLN-6899A)
60-84642H01	Nickel cadmium (standard charge, omni-housing) (replaces NLN-6761A)
60-84643H01	Nickel cadmium (standard charge slimline) (replaces NLN-6682A)
60-84815H01	Mercury (omni-housing, high power) (replaces NLN-6936A)

HT 100 Radios

NLN-6781B	Use 60-84184H02
60-84184H02	Nickel cadmium (replaces NLN-6781B)

HT 200 Radios

NLN-6238A	Use 60-84735H01
NLN-6239A	Use 60-82668D01
NLN-6547A	Use 60-83075E01
NLN-6607A	Use 60-83893C01
60-82668D01	Mercury (replaces NLN-6239A)
60-83075E01	Mercury for hazardous duty radios (replaces NLN-6547A)
60-83624C01	Alkaline 18V
60-83893E01	Nickel cadmium for use in hazardous duty radios. Note, radio not "intrinsically" safe with this battery. (replaces NLN-6607A)
60-84735H01	Nickel cadmium (replaces NLN-6238A)

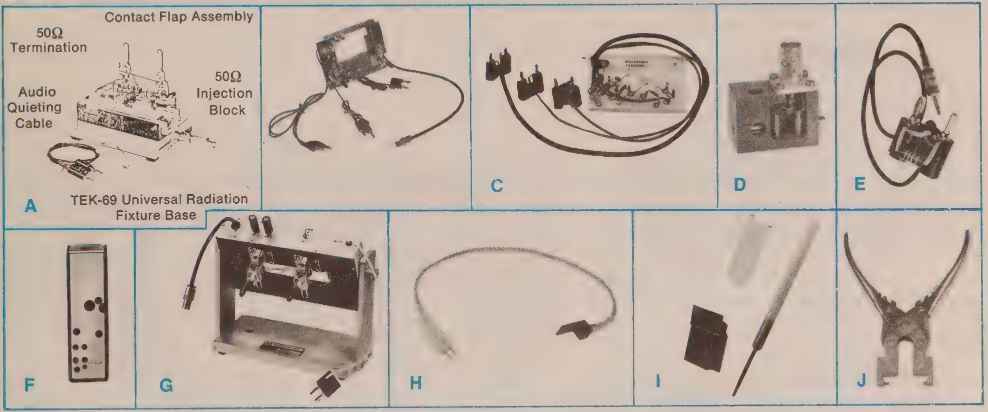
HANDIE-COM Radios

NLN-8002A	Use 60-82324J01
NLN-8095A	Use 60-82325J01
NLN-8096A	Use 60-82387J01
NLN-8104A	Use 60-84306A65 (order 10)
NLN-8105A	Use 60-82389J01
NLN-8106A	Holder for 10 "AA" cells (NLN-8104A; NLN-8105A)
NLN-8470A	Use 60-83062J01
60-82324J01	Nickel cadmium standard charge, replaces NLN-8002A
60-82325J01	Mercury (sealed package) replaces NLN-8095A
60-84306A65	Mercury "AA" (replaces 60-82357J01, NLN-8104A, and NLN-8277A) (order 10)
60-82387J01	Nickel cadmium rapid charge, replaces NLN-8096A
60-82389J01	Alkaline "AA" (replaces NLN-8105A) (pack of 10)
60-83062J01	Alkaline (sealed package) replaces NLN-8470A

PT SERIES Radios

NLN-5205A	Use 60-5128G01
NLN-6310A	11 industrial D cells
NLN-6406A	22 industrial D cells
NLN-6408A	Use 60-83420D01
60-5128G01	Nickel cadmium battery for NPN-1007A and NPN-6031A PT 200/300 power packs (replaces NLN-6267, NLN-5205, and 60-5764C01)
60-5764C01	Use 60-5128G01
60-82356F01	Nickel cadmium for PT400 power packs, cold temperature version, standard charge.
60-83420D01	Nickel cadmium standard charge (2 positive, 1 negative socket) for NPN-1006A and NPN-6038A PT400 power packs (replaces NLN-6408A)

Pager Service Aids



See chart for model numbers.

Radiation/Alignment Fixtures

A These fixtures provide an efficient and convenient means of holding PAGEBOY and METRO-PAGEBOY Receivers for servicing. A radiating element in each fixture provides for correlated signal measurements. Built-in RF connectors provide ready access to RF input terminals for additional sensitivity measurements. The TEK-69 universal radiation alignment fixture provides a controlled RF source which can be used directly or with adapters and contact flaps to radiation test a number of different paging receivers. It is a broadband RF radiation source which includes the TEKA-99, 50 ohm termination. The 58-80322A17, 6dB pad is recommended for use at the input to the fixture to properly terminate the RF cable from the generator.

Conversion Kit For TEK-69A Fixture

Provides hardware and instructions to field convert the older cam type TEK-69 fixtures to the new shutter type actuator mechanism for a more positive means of operating the radio reset button on FNC series pagers.

PK-796 Conversion Kit

Radiation Fixture Adaptors

B These adaptors are used to build upon universal fixtures to allow servicing of specific radios.

Contact Flap Assemblies

C Use of these assemblies facilitates connections to the test points (power and metering points) on the receiver board. Connections are made through access holes in the Alignment Housing Kits. Used in conjunction with radiation fixture.

Injection Blocks

D Provides proper 50 ohm termination to couple signal directly to pager.

Audio Cables

E Audio quieting cables TEKA-97 and TEKA-98 for A03 FNC and A04 FNC pagers, respectively are required for 20dB quieting measurements. TEKA-83 required for PAGECOM, MINITOR, and DIRECTOR pagers provides a 3.9 ohm termination for connecting the audio output of a pager to an AC voltmeter.

Alignment Housing Kits

F Alignment Housing Kits provide standard pager housings which enable proper alignment of the pager in the appropriate Radiation Fixture.

Analyzing Test Fixtures

G Use the Analyzing Test Fixture to service pager circuit boards outside of the pager housing. In addition to holding the circuit boards for convenient servicing, the test fixtures provide connections for power input, metering, RF, and audio for servicing.

Interconnect Cables

H Interconnect cable assembly allows two PC boards in a pager to be connected for servicing.

Service Tool Kits

I Contains alignment tool and accessories necessary for proper alignment of pager.

Service Accessories

Other service accessories available to facilitate servicing are described below.

30-84875H01	RF adaptor cable incorporates female receptacle and jack to connect pager to signal generator.
58-80322A17	6dB pad, 50 ohm. Provides proper signal generator termination at radiation fixture input.
SLN-6435A	Isolation transformer required for servicing DNC and FNC pagers and used in conjunction with RTX-1000A and RTX-1001A.
TEK-67	DC amplifier to permit alignment of A04FNC pagers using a general purpose oscilloscope having input sensitivity of 10mv/div. or more.
TEKA-99	50 ohm termination. Included with TEK-69.

Service Aids Kits

These kits contain a number of service aids for ease of ordering.

TEK-62	For A03FNC pager. Consists of TEK-69, TEKA-89, TEKA-95, TEKA-97, and TEKA-99.
TEK-63	For A04FNC pager. Consists of TEK-69, TEKA-90, TEKA-96, TEKA-98, and TEKA-99.
RTX-1000A	For DVC series pagers (low band & VHF only). Consists of RTL-4007A, RTL-4008A and RSX-4003A. Order SLN-6435A isolation transformer separately.
RTX-1001A	For JVC series pagers (low band & VHF only). Consists of RTL-4007A, RTL-4022A, and RSX-4003A. Order SLN-6435A isolation transformer separately.
TEK-77	For A04CAC pager. Consists of TEK-69, TEKA-96, TEKA-105 and TEKA-99.

Pin Flaring Tool

J This convenient hand tool is used to flare the roll pin on PAGEBOY II clips thereby preventing it from falling out during use.

66-80333A36 Hand Flaring Tool.

Pager Service Aids

Pager Service Aids Cross Reference

Tone & Voice Pagers

	Pager Model	PAGEBOY II			PAGECOM			MINITOR			DIRECTOR			DIMENSION IV			SPIRIT		
	Service Aids	A03DNC	A03FNC	A04FNC	A01EAC	A03EAC	A04EAC	H01EAB	H03EAB	H04EAB	A01GBC	A03GBC	A04GBC	A01DVC	A03DVC	A04DVC	A01JVC	A03JVC	A04JVC
Radiation Fixture	NEN-6076A	X																	
	TEK-69A		X(1)	X(2)										X	X	*	X	X	*
	TEK-49(3)				X	X													
	TEK-59(4)						X												
	TEK-74(5) (6)							X	X		X	X							
	TEK-76(5) (6)									X			X						
Rad Fix Adaptors	RTL-4007A													X	X	*	X	X	*
Contact Flap	1-84206D91	X																	
	TEKA-89		X(1)																
	TEKA-90			X(2)															
Inj Blocks	TEKA-95		X(1)																
	TEKA-96			X(2)															
Audio Cables	TEKA-83				X	X	X	X	X	X	X	X	X						
	TEKA-97		X(1)																
	TEKA-98			X(2)															
Alignment Housing	NEN-6077A	X																	
	NEN-6086A			X															
	NEN-6087A		X																
	15-84203D33					X													
	15-05391B01						X												
	15-05652D01							X	X	X	X	X	X						
	RTL-4008A													X	X	X			
	15-05202D01				X														
	RTL-4022A																X	X	X
Analyzing Fixture	TEK-50	X																	
	TEK-64		X																
	TEK-65			X															
	TEK-54				X	X	X												
	TEK-75							X	X	X	X	X	X						
Interconnect Cables	1-84203D32				X	X	X	X	X	X	X	X	X						
Service Tool Kit	NLN-6968A	X																	
	NLN-8473A		X																
	ST-1158			X															
	NLN-6245A				X	X		X	X		X	X							
	NLN-8542A						X			X			X						
	RSX-4003A													X	X	X	X	X	X
Service Accessories	30-84875H01				X	X	X	X	X	X	X	X	X						
	58-80322A17		X	X										X	X	X	X	X	X
	SLN-6435A	X	X	X										X	X		X	X	
	TEK-67			X															
	TEKA-90(10)		X	X										X	X	X	X	X	X

Tone Alert Pagers

	Pager Model	PAGEBOY II			METRO-PAGEBOY							METRX		
	Service Aids	A01CAC	A03CAC	A04CAC	A01MEC	A03MEC "A"	A03MEC "B" (8)	A01MAC	A03MAC	A01TEC	A03TEC (8)	A01AGC	A03AGC	A04AGC
Radiation Fixture	NEN-6076A		X											
	NEN-6080A					X	X				X			
	NEN-6084A	X			X									
	TEK-69			X			X	X	X	X		X	X	X
Rad Fix Adaptors	RTL-4004A													X
	TEKA-107A											X	X	
Contact Flap	1-83554F24				X									
	1-84206D92		X											
	1-84207D80	X												
	TEKA-86					X	X				X			
	TEKA-94									X				
	TEKA-101							X						
	TEKA-103								X					
	TEKA-104(9)						X							
	TEKA-105			X										
	RTL-4019A(9)										X			
Inj Blocks	TEKA-93						X	X	X	X				
	TEKA-108											X	X	X
Alignment Housing	NEN-6078A		X											
	NEN-6079A					X								
	NEN-6081A	X												
	NEN-6083A				X									
	NEN-6085B										X			
	NEN-6089A									X				
	NEN-6091A						X		X					
	NEN-6094A							X						
	NEN-8000A			X										
	NEN-8002A											X	X	X
Analyzing Fixture	TEK-51		X											
	TEK-56	X												
	TEK-58				X									
	TEK-60					X	X				X			
	TEK-70									X				
	TEK-71								X					
	TEK-73							X						
	TEK-78			X										
	TEK-82(7)											X	X	X
Interconnect Cables	TEKA-109											X	X	X
Service Tool Kit	NLN-8473A		X	X										
	NLN-8512A					X	X							
	NLN-8581A	X												
	NLN-8607A				X									
	NLN-8633A								X		X			
	NLN-8943A							X		X				
	ST-1158A			X										
	ST-1358A											X	X	X
Service Accessories	58-80322A17			X			X	X	X	X		X	X	X
	TEKA-99(10)			X			X	X	X	X		X	X	X

NOTES
(1) Included in TEK-62
(2) Included in TEK-63
(3) Includes 15-84203D33
(4) Includes 15-05391B01
(5) TEK-49 and TEK-59 may be modified for use on EAB and GBC series pagers with PK-795.
(6) Includes 15-05652D01
(7) Contains 5 trim pots to facilitate selection of proper resistor values and the following resistor kits are recommended for replacement of factory set resistors: RPX-4009A (mono trim R12), RPX-4010A (tone level R16), RPX-4011A (B++ R129), RPX-4012A (clock R122), and RPX-4031A (Battery check R120). Order interconnect cable TEKA-109 (receiver board to decoder board) separately.
(8) TEK-69 is the preferred radiation fixture.
(9) For use with TEK-69.

*RTX-1004A Service Fixture will be available early 1979. Contact your Motorola parts representative for specific details.

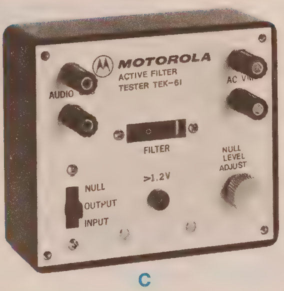
PAGEBOY II and METRO-PAGEBOY Pagers

3
Metro-Pageboy Tone Generator

A

Peak Detector
To Scope
Battery
Off
On
DC Amplifier

B



C

Tone Generator

A The S-1335B provides a convenient means of selecting the proper 5 or 6-tone numerical code address signals required to test and troubleshoot METRO-PAGEBOY Pager receivers. The output of the tone generator is used to modulate an RF signal generator to simulate the tone burst on an RF carrier.

The desired 5 or 6-tone sequence is set up easily and quickly with lever type digital switches. The output is available at standard ¾″ spaced banana jacks.

The output level is adequate to modulate all Motorola Signal Generators. Output level is variable up to 15 volts peak-to-peak into a 5000 ohm load.

In addition to the lever type digital switches and the output level control, front panel controls include a "start/stop" page pushbutton for initiating and ending the page sequence and a 3-position mode switch ("single" page, "repeat" page, and "level set") which provides a single 5-tone burst, continuous repeating bursts, or a single continuous tone for setting the output level to properly modulate the signal generator. A front panel male BNC connector labeled "sync" provides a synchronization pulse for triggering an oscilloscope.

S-1335B Tone Generator

SPECIFICATIONS

S-1335B Tone Generator

Modes: Single burst, repeat bursts, level set. Manual start/stop. **Program Switches:** 7 total. **Tone Frequencies:** 11 crystal controlled tone frequencies

R—459Hz
0—600Hz
1—741Hz
2—882Hz
3—1023Hz
4—1164Hz
5—1305Hz
6—1446Hz
7—1587Hz
8—1728Hz
9—1869Hz
X—X—2010.0 Hz

Output: Adjustable, 15 volts peak-to-peak into 5,000 ohms. **Operating Voltage:** 115V ac ± 10%.

6-Tone Modification Kit

A factory installed conversion kit which equips the original "A" suffix S-1335, 5-tone generator for 6-tone operation. This provides test capability for the newer 6-tone METRO-PAGEBOY pagers.

PK-785	Conversion kit (factory installation only). Consult your Motorola representative for details.

PAGEBOY II DC Amplifier

B Designed to amplify low level DC signals such as those encountered when aligning the preselector for Motorola portable A04 FNC radio pagers. The unit enables a low level signal (less than 1 mV) to be adequately displayed on a general purpose oscilloscope for accurate adjustments. This unit is battery powered and requires two 4.2V batteries (not supplied).

TEK-67	DC Amplifier
60-80324A12	Battery, 4.2V type TR114R Mercury.

Active Filter Test Fixture

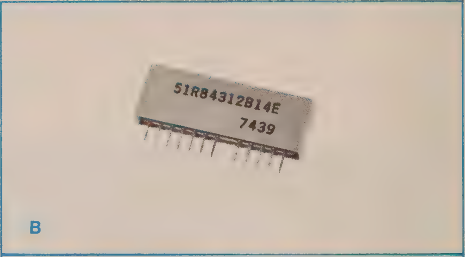
C For testing the NFN-6008A Series Active Filters used in PAGEBOY II radio pagers. How often have you waited for a new active filter only to find out that this wasn't the problem? The original filter "good" and the problem lay somewhere else in the receiver . . . you've wasted precious days in repairing the unit.

The TEK-61 Tester along with an AC VTVM, an audio oscillator, and a counter will allow you to check band pass, frequency, and insertion loss or gain of NFN-6008A Series Active Filters.

TEK-61 Active Filter Test Fixture

Code Plug Programmer/Reader, Code Plugs, and Code Plug Verifier

A



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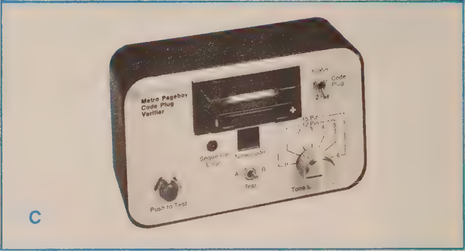


C

Code Plug Programmer/Reader for the METRO-PAGEBOY Radio Pager

- **100,000 Address Capability**
- **Automatic Verification**
- **Desk-Top Styling**
- **Compact Size**

A Insert a code plug in the receptacle and depress the "read" button. If the code plug is uncoded, the "blank" indicator will be illuminated. If the code plug has been previously programmed, its code will appear in the window.

If the code plug is blank, depress the "clear" button. You are now ready to enter the desired five-digit code via the keyboard. Once the code is entered, depress the "program" button. (The button will not depress unless the five required digits are entered.) Instantaneously the code will be "fused" in the code plug and the code will automatically appear in the window. The code plug is now ready to be put into the "Metro Pageboy" pager.

An optional kit is available to convert this unit for the newer 6-tone METRO-PAGEBOY pager. Order PK-784 in addition to the Code Plug Programmer/Reader for factory installation. This option does not impair 5-tone operation. This convenient desk top unit is a trim 5″ (127mm) high x 19″ (483mm) wide x 10″ (254mm) deep and operates on 117V ac.

SP-04901761	Code Plug Programmer/Reader
PK-784	6-tone modification kit for METRO Programmer

Note: Reader/Programmer SP-4900061 may be modified to accommodate the new Six Tone Pager requirements. Existing units must be returned to the Parts Department for modification.

Ordering the SP-04901761 Code Plug Programmer/Reader: This unit is not normally supplied by the Part Department. Please contact your Motorola representative for ordering information.

Conversion Kits

The following are modification kits to convert 5-tone Code Plug Programmer/Readers presently in the field to the newer 6-tone Programmer/Reader. These kits allow reading or programming either 5 or 6-tone code plugs as described above. These kits are factory installed options. Consult your Motorola representative for availability and shipment schedule.

PK-783	6-tone modification kit for SP049-00061
PK-784	6-tone modification kit for SP049-01761

Code Plugs

B Code plugs for determining the paging code of Motorola Radio Pagers may be ordered blank or pre-programmed. To expedite handling pre-programmed code plugs should be listed on a separate order along with the desired five-digit code for each. Contact your Motorola representative for code plugs not listed.

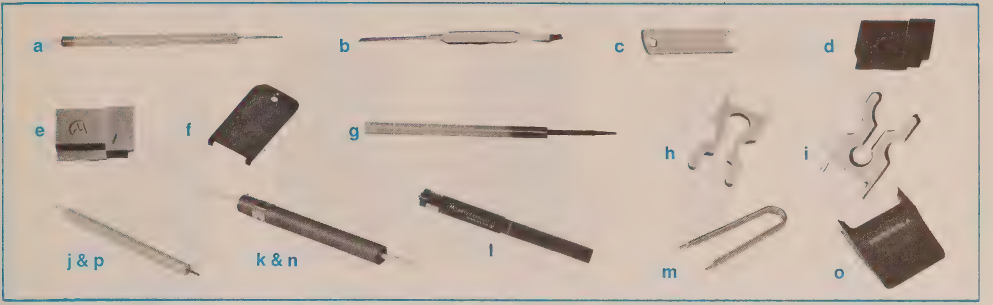
NLN-8192A	5-tone Blank Code Plug (replaces 51-84312B14) for MEC series METRO-PAGEBOY Pagers.
NLN-8915A	6-Tone Blank Code Plug (replaces 51-84333G34) for MAC series METRO-PAGEBOY Pagers.
NLN-8515A	Pre-programmed 5-tone Code Plug (specify code) for MEC series METRO-PAGEBOY Pagers.
NLN-8918A	Pre-programmed 6-tone dual alert code plug for MAC series METRO-PAGEBOY Pagers. (specify code)
NLN-4150A	6-tone blank code plug for AGC series METRX Pager.
NLN-4327A	Pre-programmed 6-tone code plug (specify code) for AGC series METRX Pager.

Code Plug Verifier

C A self contained unit used to test the MEC, MAC, and AGC Series METRO-PAGEBOY code plugs. The unit can perform an operational check to verify that the correct code is present. Battery operated. Six AA batteries required.

TEK-68	Verifier
SP-4902641	Adaptor required for use with AGC series pagers.
60-5310A01	Battery, 1.5V, type AA Mercury

Pager Service Tools



TOOL	PART OF KIT NO.	MODEL USED ON	
(Fig. a) **66-82186E01** Alignment Tool	**NLN-6245A**	H01BNC A03EAC A01EAC H01EAB H03EAB A01GBC A03GBC	— PAGEBOY I Pager — PAGECOM Pager — PAGECOM Pager — MINITOR Pager — MINITOR Pager — DIRECTOR Pager — DIRECTOR Pager
	NLN-6470A	H24DCN	— HT-200
	NLN-6790A	H03BNC	— PAGEBOY I Pager
	NLN-8542A	A04EAC H04EAB A04GBC	— PAGECOM Pager — MINITOR Pager — DIRECTOR Pager
	NLN-8581A	A01CAC	— PAGEBOY II Pager
	NLN-8607A	A01MEC	— METRO-PAGEBOY Pager
	NLN-8943A*	A01MAC A01TEC	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager
(Fig. b) **66-83034A01** Alignment Tool	**NLN-8542A**	A04EAC H04EAB A04GBC	— PAGECOM Pager — MINITOR Pager — DIRECTOR Pager
(Fig. c) **66-84033H01** Service Tool	**NLN-6790A**	H03BNC	— PAGEBOY I Pager
(Fig. d) **66-05134A01** Cover Removal Tool	**NLN-6968A**	A03DNC	— PAGEBOY II Pager
(Fig. e) **66-05134A02** Cover Release Key	**NLN-6968A**	A03DNC	— PAGEBOY II Pager
	NLN-8473A	A03CAC A03FNC	— PAGEBOY II Pager — PAGEBOY II Pager
	NLN-8512A	A03MEC	— METRO-PAGEBOY Pager
	NLN-8633A	A03TEC A03MAC	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager
	NLN-8581A	A01CAC	— PAGEBOY II Pager
	NLN-8607A	A01MEC	— METRO-PAGEBOY Pager
	NLN-8943A*	A01MAC A01TEC	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager
(Fig. f) **66-05170A01** Active Filter Removal Tool	**NLN-6968A**	A03DNC	— PAGEBOY II Pager
	NLN-8473A	A03CAC A03FNC	— PAGEBOY II Pager — PAGEBOY II Pager
	NLN-8581A	A01CAC	— PAGEBOY II Pager
(Fig. g) **66-82824C05** Alignment Tool	**NLN-6790A**	H03BNC	— PAGEBOY I Pager
	NLN-6968A	A03DNC	— PAGEBOY II Pager
	NLN-8473A	A03CAC A03FNC	— PAGEBOY II Pager — PAGEBOY II Pager
	NLN-8512A	A03MEC	— METRO-PAGEBOY Pager
	NLN-8633A	A03TEC A03MAC	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager
(Fig. h) **66-05180B01** Code Plug Extractor	**NLN-8512A**	A03MEC	— METRO-PAGEBOY Pager
	NLN-8607A	A01MEC	— METRO-PAGEBOY Pager
(Fig. i) **66-05389B01** Code Plug Extractor	**NLN-8633A**	A03TEC A03MAC	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager
	NLN-8943A*	A01MAC A01TEC	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager
(Fig. j) **66-05832B01** Alignment Tool	**ST-1158**	A04FNC A04CAC	— PAGEBOY II Pager — PAGEBOY II Pager
(Fig. k) **66-80329A63** Alignment Tool & **(Fig. l)** **NLN-4681A** Chassis Removal Tool	**RSX-4003A**	A01DVC A03DVC A04DVC A01JVC A03JVC A04JVC	— DIMENSION IV Pager — DIMENSION IV Pager — DIMENSION IV Pager — SPIRIT Pager — SPIRIT Pager — SPIRIT Pager

TOOL	PART OF KIT NO.	MODEL USED ON	
(Fig. m) **66-80324A34** & **(Fig. n)** **66-80329A63** & **(Fig. o)** **66-5552E01** & **(Fig. p)** **ST-1158**	**ST-1358A**	A01AGC	— METRX Pager
		A03AGC	— METRX Pager
		A04AGC	— METRX Pager

RADIO MODEL NUMBER SERIES		ALIGNMENT TOOL KIT	TOOLS	
H01BNC **A03EAC** **A01EAC** **H01EAB** **H03EAB** **A01GBC** **A03GBC**	— PAGEBOY I Pager — PAGECOM Pager — PAGECOM Pager — MINITOR Pager — MINITOR Pager — DIRECTOR Pager — DIRECTOR Pager	**NLN-6245A**	**66-82186E01**	— Alignment Tool
H03BNC	— PAGEBOY I Pager	**NLN-6790A**	**66-84033H01** **66-82186E01** **66-82824C05**	Service Tool Alignment Tool (Metal) Alignment Tool
A03DNC	— PAGEBOY II Pager	**NLN-6968A**	**66-05134A01** **66-05134A02** **66-05170A01** **66-82824C05**	Cover Release Key Cover Release Key Active Filter Removal Tool Alignment Tool
A03CAC **A04CAC**	— PAGEBOY II Pager — PAGEBOY II Pager	**NLN-8473A**	**66-05134A02** **66-05170A01** **66-82824C05**	Cover Release Key Active Filter Removal Tool Alignment Tool
A03FNC	— PAGEBOY II Pager	**ST-1158A**	**66-05832B01**	Alignment Tool (For A40CAC only)
A03MEC	— METRO-PAGEBOY Pager	**NLN-8512A**	**66-05134A02** **66-05180B01** **66-82824C05**	Cover Release Key Code Plug Extractor Alignment Tool
A04EAC **H04EAB** **A04GBC**	— PAGECOM Pager — MINITOR Pager — DIRECTOR Pager	**NLN-8542A**	**66-82186E01** **66-83034A01**	Alignment Tool Alignment Tool
A01CAC	— PAGEBOY II Pager	**NLN-8581A**	**66-05134A02** **66-05170A01** **66-82186E01**	Cover Release Tool Active Filter Removal Tool Alignment Tool
A01MEC	— METRO-PAGEBOY Pager	**NLN-8607A**	**66-05134A02** **66-05180B01** **66-82186E01**	Cover Release Key Code Plug Extractor Alignment Tool
A03TEC **A03MAC**	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager	**NLN-8633A**	**66-05134A02** **66-05389B01** **66-82824C05**	Cover Release Key Code Plug Extractor Alignment Tool
A04FNC	— PAGEBOY II Pager	**ST-1158**	**66-05832B01**	Alignment Tool
A01DVC **A03DVC** **A04DVC** **A01JVC** **A03JVC** **A04JVC**	— DIMENSION IV Pager — DIMENSION IV Pager — DIMENSION IV Pager — SPIRIT Pager — SPIRIT Pager — SPIRIT Pager	**RSX-4003A**	**66-80329A63** **NLN-4681A**	Alignment Tool Chassis Removal Tool
A01MAC **A01TEC**	— METRO-PAGEBOY Pager — METRO-PAGEBOY Pager	**NLN-8943A***	**66-5134A02** **66-5389B01** **66-82186E01**	Cover Release Tool Code Plug Extractor Alignment Tool
A01AGC **A03AGC** **A04AGC**	— METRX Pager — METRX Pager — METRX Pager	**ST-1358A**	**66-80324A34** **66-80329A63** **66-5552E01** **ST-1158**	Extractor Tool Alignment Tool Service Tool Alignment Tool (same as 66-5832B01)

* Please order piece parts

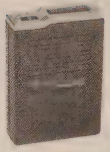
Battery Cross Reference

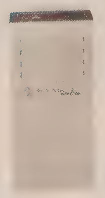
PAGEBOY II

METRO-PAGEBOY

PAGEBOY I

PAGECOM


DIMENSION IV


DIRECTOR

MINITOR

SPIRIT

METRX

Pagers

PAGEBOY II Pagers & METRO-PAGEBOY Pagers

(A01, A03, A04 CAC) (A03 DNC) (A03, A04 FNC) (A01, A03 MAC) (A01, A03 MEC) (A01, A03 TEC)

NLN-6199A	Use NEN-6034A
NLN-6965A	Use 60-5104A01
NLN-8277A	Use 60-84306A65
NLN-8278A	Use 60-5310A01
60-5633A01	Use NEN-6034A
NLN-8276A	Adapter kit to convert tone only Pageboy II to nickel cadmium operation. Consists of 60-5104A01 and 1-5953A16 adapter
NLN-8519A	Use 01-5953A16
60-5104A01	Nickel cadmium (tone and voice) (replaces NLN-6965A)
60-5310A01	Alkaline "AA" (tone only) (replaces NLN-8278A)
60-84306A65	Mercury "AA" (tone only) replaces NLN-8277A)
NEN-6034A	Box of 24 60-5633A01 mercury batteries for tone and voice (replaces NLN-6199 and 60-5633A01)
01-5953A16	Adapter only for NLN-8276 and NLN-8519

PAGEBOY I Pager

NLN-6430A	Use 60-868967
NLN-6431A	Use 60-83009H02
NLN-6811A	Use 60-83778H03
60-868967	Mercury 4.0V
60-868968	Mercury 2.5V (VHF tone only)
60-83009H01	Nickel cadmium 2.5V (VHF tone only)
60-83009H02	Nickel cadmium 3.75V (VHF tone and voice)
60-83778H02	Nickel cadmium 2.5V (VHF tone only—U.L. listed)
60-83778H03	Nickel cadmium 3.75V (VHF tone and voice—U.L. listed)

PAGECOM Pager
DIMENSION IV Pager
DIRECTOR Pager
MINITOR Pager
SPIRIT Pager

(A01, A03, A04 EAC)
(A01, A03, A04 DVC)
(A01, A03, A04 GBC)
(H01, H03, H04 EAB)
(A01, A03, A04 JVC)

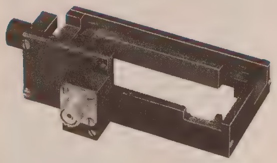
NEN-6034A	Kit of 24 mercury batteries 60-5633A01
NLN-6199A	Use NEN-6034A
NLN-6965A	Use 60-5104A01
60-5633A01	Use NEN-6034A
60-5104A01	Nickel cadmium (replaces NLN-6965A)
60-82936C01	Pack of 2 mercury batteries (same as NLN-6199)

METRX Pager

(A01, A03, A04 AGC)

NLN-8278A	Use 60-5310A01
60-5310A01	Alkaline "AA" (replaces NLN-8278A)

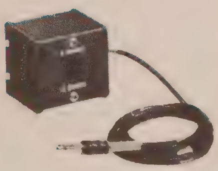
PAGEBOY I Pager



A

TEKA-36
30-84875H01

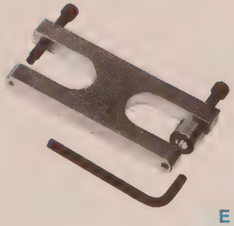
B



C

NLN-6790A
66-82186E01

D



E

Receiver Test Fixture

A The NEN-6066A Test Fixture is designed for the maintenance and testing of the H03BNC series VHF Pager PAGEBOY and "Bellboy"* receivers. Constructed of durable phenolic material it provides a VHF receptacle for connection of a signal generator and features a built in radiation loop for proper coupling to the receiver under test. A spring loaded button is provided for those models that have a "push to listen" switch to permit continuous monitoring of the audio during alignment and quieting checks.

NEN-6066A	Test Fixture

*Trademark American Tel. & Tel. Co.

RF Adaptor Cable

B The TEKA-36 RF cable is 18" of RG58-U, which terminates in a miniature phone plug on one end and a "quick-change" male UHF connector on the other. This provides fast, easy connections when using the cable with a signal generator for receiver alignment. (Not recommended for UHF.)

30-84875HO1 Adaptor Cable is supplied with a BNC Connector and a miniature plug. It is used to connect the Pager to a signal generator.

TEKA-36	RF Adaptor Cable
30-84875H01	Adaptor Cable

Audio Adaptor

C Useful in measuring audio output when making 20 dB quieting checks. Consists of a 20-pin plug with a slide switch for selection of proper speaker matching resistor (8 or 15 ohms), terminated with a miniature phone plug for connection to the pager. Designed to plug into Motorola test set.

TEKA-57	Audio Adaptor

Alignment Tool Kits

D NLN-6790A Alignment tool kit for H03BNC high band PAGEBOY I Pager. Includes: 66-84033H01 service tool, 66-82186E01 alignment tool and 66-82824-C05 alignment tool.

NLN-6790A	Alignment Tool Kit
66-82186E01	Alignment Tool only for H01BNC low band PAGEBOY I Pager. (Same as NLN-6245A)

Riveting Tool

E Riveting Tool for battery contacts on PAGEBOY I Pager housing.

ST-1093	Riveting tool

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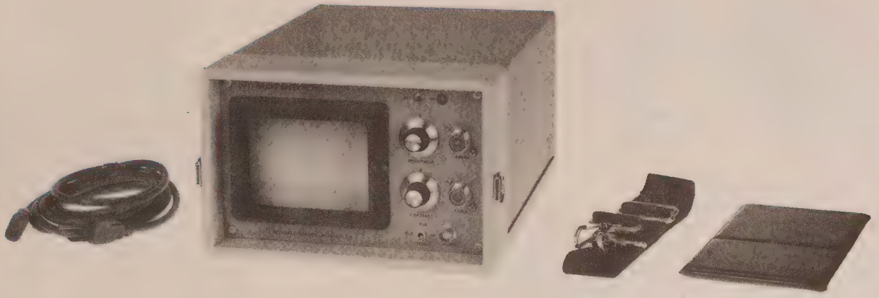
Visual Communications Test Equipment and Service Aids



(Detachable line cord, neck strap, and sun shield shown with video monitor.)

Portable Video Monitor

FEATURES

- **Specifically designed as a field service instrument.**
- **Battery operation and built-in charger.**
- **Neck strap for hands-free operation or unit tie down.**
- **Calibrated controls.**
- **12 MHz bandwidth.**
- **Loop-through operation, 75 Ohm termination switch.**
- **Scope monitoring connector.**
- **Accurate for zoom lens tracking.**

This portable video monitor is specifically designed for field servicing of video and information display systems. The unit is invaluable for locating system malfunctions quickly, for fast accurate system adjustments such as field of view and scene focus, and for determining performance of monitors, cameras, and data transmission equipment. Video and data cable installation quality can be easily verified at all terminal points. Video switching equipment can be easily checked for clean switching functions.

The Motorola portable video monitor is a field proven test instrument which incorporates a specially modified Motorola 5-inch video monitor. The unit also includes a gel cell battery, a special charging circuit, and external connectors and controls all packaged in a rugged metal housing. All components (except cathode ray tube) are solid state for compact size, low power drain and minimum maintenance.

A sealed gel cell battery eliminates the need for ac power or extension cords at the servicing site and insures stable picture geometry and resolution for up to 2½ hours of true portable field operation. A rugged strap allows safe hands-free operation when checking equipment located on tower supports or other difficult locations. Large knobs are conveniently located and the entire front panel is recessed for control protection and operation in adverse weather. The unit can be used in full daylight with accessory sun shield. Calibrated contrast and brightness controls allow precise camera adjustments for uniform pictures in multicamera systems.

A built-in charger allows the battery to be easily recharged from any 117 VAC outlet. The charger automatically switches to trickle charge when battery is fully charged to prevent over charging and damage to the battery.

Twelve MHz video response, excellent geometry and small spot size of the 5-inch cathode ray tube provide crisp picture detail, and allow clear alphanumeric displays, precise focus adjustment and check out of systems with up to 650 lines of horizontal resolution.

A front panel switch provides 75 Ohm termination at the monitor or loop-through operation via two front panel video connectors. The composite video signal can also be scope monitored by means of a front panel BNC connector.

R-1018A	Portable Video Monitor

ST-1096 2:1 Step Down Isolation Transformer. Required for 230 v operation of built-in charger.

SPECIFICATIONS (R-1018A)

Picture Tube (CRT): 5-inch measured diagonally (127 mm); 13 sq. in. viewing area (84 sq. cm.), 55° deflecting angle, P4 phosphor. **Power:** 12VDC at 650 mA via gel cell battery with built-in charger. **Charger Power:** 117V AC. **Composite Video Input:** 0.5V to 2.5V composite p-p, sync negative (75 Ohms terminated, 12 k Ohms unterminated). **Horizontal Resolution:** at least 650 lines center, 500 lines corners. **Video Response:** 10 Hz to 12 MHz within −3 dB. **Linearity:** within 2% as measured with standard EIA ball chart and dot pattern. **High Voltage:** 9.5 KV at 50 microamps beam current, nominal. **Horizontal Retrace Time:** 11.0 microsec. max. **Scanning Frequency:** 15,750 Hz ±500 Hz (including 15,360 Hz for information display systems) horizontal and 50/60 Hz vertical. **Environment:** 0° C to 50° C operating temperature, −40° C to +60° C storage temperature, 10,000 feet (3048 meters) maximum operating altitude, and complies with applicable DHEW rules on X radiation.

Visual Communications Test Equipment and Service Aids

Portable Video Bar/Dot Generator

FEATURES

- **Generates standard pattern for monitor alignment and Trouble-shooting Triax and Coax Transmission lines.**
- **Designed to drive up to 5000 ft. of Triax cable at IV p-p composite video.**
- **Both vcs (visual communications systems) and IDS (information display systems) operable at selectable horizontal sweep frequencies of 15,750 Hz and 15,360 Hz respectively.**
- **Lightweight, easy to carry, and battery operated for field use.**

The Motorola Portable Video Bar/Dot Generator is a small portable television test generator designed for convenient field use in the testing of television cable transmission systems and proper adjustment of display devices. The unit is powered by two internal 9 volt alkaline batteries and is especially useful in outdoor, on-site testing where power is not readily available.

The output is a non-interlace composite video with industrial sync pulse format and provides selectable patterns for use as a reference in the adjustment of size and linearity of television display devices. Precise "crosshatch," BAR, DOT, horizontal only bar, and vertical only bar patterns are provided. The number of horizontal and vertical elements in the patterns is switch selectable in 3 fixed combinations.

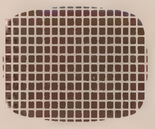
Nominal output levels are 0.7 volt video (including blanking pedestal), plus 0.3 volt sync pulses. The generator is source terminated for proper drive of 75 Ohm coaxial Triaxial line.

R-1015A	Portable Video Bar/Dot Generator

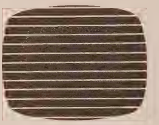
SPECIFICATIONS

Functions: Bar, dot, H bar, & V bar in selectable format of horizontal and vertical elements of 21 x 15, 11 x 7, & 1 x 1. **Output Video Signal:** Format: Composite video. Level: 0.7 volt video + 0.3v sync. Polarity: white positive. Impedance: 75 Ohm, source terminated. Level: 3v p-p (unterminated). Coupling: direct (DC), baseline at ground potential. **Line Rate (Horizontal Sweep Frequency):** switch selectable, 15,750 Hz standard VCS (video communications systems) or 15,360 Hz IDS (information display systems). **Field Rate (Vertical Sweep Frequency):** switch selectable, 60 Hz VCS or 58 Hz IDS. **Output Connector:** SO 239 (UHF). **Power Requirement:** 18v DC at 22 mA via 2 internal 9v alkaline batteries. Provides approximately eight hours operation. **Size:** 1½" h x 3½" d x 7½" l. **Weight:** 1½ lbs. **Operating temperature:** 0° to 50° C.

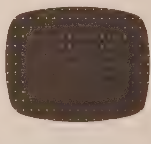
Four Patterns



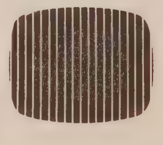
BAR PATTERN of cross-hatched white lines equally spaced on a black background is useful to check linearity of display devices.



H-BAR PATTERN of only horizontal lines is a good way to check mid-frequency response. Pattern locks to raster lines so that each bar line is stable.

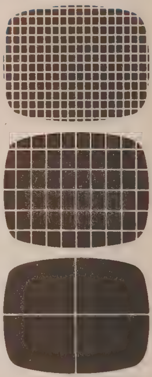


DOT PATTERN is an array of small white dots on a black background that helps when adjusting and checking scan linearity and is also useful in checking convergence of color display devices.



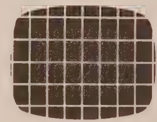
V-BAR PATTERN of only vertical lines is a good way to check your system's high frequency video response.

Three Formats For Each Pattern

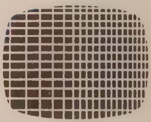


enables you to view each of the four test patterns in three different formats. Upper screen shows the overall format of the BAR pattern which is especially useful for checking display linearity. Mid-range format on center screen is an ideal way to check display size and detect overscan. Close-up format on the bottom screen shows only one horizontal and vertical element which provides an exact reference for checking display centering.

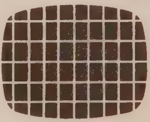
Common CCTV Problems To Look For . . . .



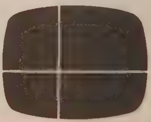
OVERSCAN



POOR LINEARITY



POOR VIDEO RESPONSE



OFF CENTER

Visual Communications Test Equipment and Service Aids

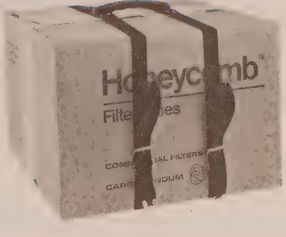
VIDICON LENS 1:1.9 f=12.5mm No. 67907 LENS MADE IN JAPAN

A

B

LENS
TISSUE
3

C



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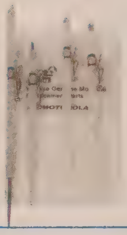


E

Lens Kit

A Kit contains three lenses; 12.5 mm, 25 mm, and 50 mm for standard field of view set up for accurate camera alignment. Usable in field or shop bench set up.

SLN-6199A	Lens Kit

Low Light Level Camera Adapter Filter Kit

B Required for testing and set up of low light level camera in normal light environments. Reduces the amount of available light to allow zoom lens tracking during the day and prevent damage to the vidicon during servicing. Kit consists of three items: a black plastic cover for full capping of lens with no light leakage, a filter ring with built-in filter, and an extra filter. A single filter provides 5% light transmission and the addition of the second filter provides 0.01% (10^{-4}) light transmission.

RTL-4030A	Low-Light Level Camera Adaptor Filter

Lens Cleaning Kit

C For cleaning those delicate lens. Contains tissue, chamois, and solvent. For removing grease film left by fingerprints etc. Kit also contains hand operated air brush.

RSX-4009A	Lens Cleaning Kit

All Purpose Carrier

D Can be used to carry cameras, large pieces of test equipment etc. Will hold up to 100 lbs. Handle made of durable black plastic attached to 60 inch braided strap 1 inch wide.

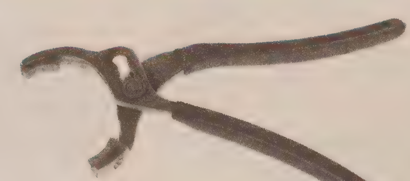
RSX-4010A	All Purpose Carrier

Tuning Tool Kit

E Contains the most common tuning tools required to align MOCAM cameras as well as other camera series. Consists of two 66-835721 tuning tools and one each 66-82824C01 and 66-82186E01 all with pencil type clips and inserted in a convenient pocket protector case. Tools may also be purchased separately.

RSX-4029A	Tuning Tool Kit

Visual Communications Test Equipment and Service Aids



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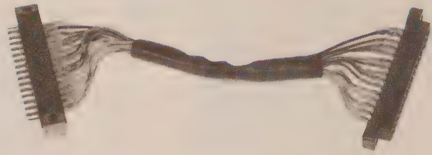

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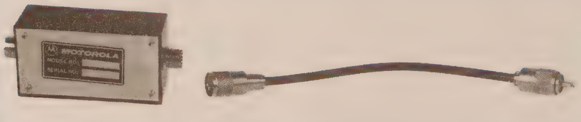

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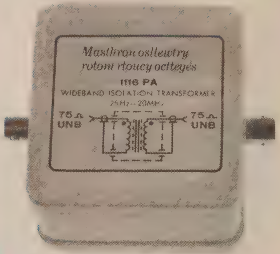

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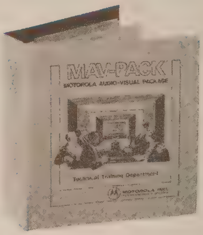


E

Soft Jaw Pliers

A These rubber jaw pliers are required for removing lenses to eliminate lens damage and allow proper setting of lens "C" mount threads for maximum dust sealing to lens body. They are also useful in removing cable connectors.

RSX-4022A	Soft Jaw Pliers

Servicing Module for S-1140B and S-1141A Cameras

B This kit is used like an extender board to service camera PC boards.

SLN-6176A	Service Module

Isolators

C These kits combat RFI (radio frequency interference) and 60 Hz and other low frequency interference for clean distortion-free displays. SFN-6027 will remove up to 10 V p-p of hum voltage.

SFN-6025A	AC Line Isolator
SFN-6026A	Coax Line Isolator
SFN-6027A	Hum and Transient Isolator
SLN-6555A	Camera Isolation Kit

Video Transformer

D This unit is used for isolating transmission line to reduce hum pick up with slight roll off of video low frequency and black content. May eliminate the need to replace degraded line.

24-83196F01	Video Transformer

Audio-Visual Training Packages

Closed Circuit Television Fundamentals

E MAV-PACK/VVA1 is designed to familiarize the technician with Motorola Closed Circuit Television equipment. The package begins with an explanation of basic television principles including the production of the composite video signal. Following basic TV principles, Camera (both standard and Low-Light Level) and Monitor operation is explained

A section on CCTV Accessories provides information on video switchers, video tape recorders and other associated equipment.

MAV-PACK/VVA1	Audio Visual Training Package

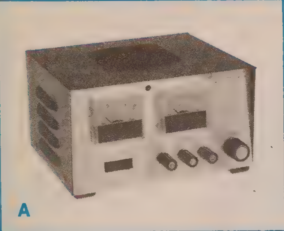
CCTV System Installation and Maintenance

MAV-PACK/VVA2 covers all the necessary fundamentals needed to install and service a CCTV System. The Installation Section covers cable, camera, monitor and accessory installation principles. In the Maintenance Section, both system and equipment servicing techniques are presented as well as a review of camera and monitor circuit operation. The System Troubleshooting Section deals with common problems arising during installation.

The Camera Servicing Section includes the step-by-step procedures for camera alignment on both standard and Low-Light Level Cameras. It is suggested that the technician reviews MAV-PACK/VVA1 prior to starting this MAV-PACK.

MAV-PACK/VVA2	Audio Visual Training Package

Visual Communications Test Equipment and Service Aids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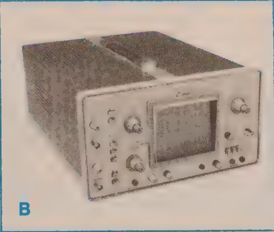
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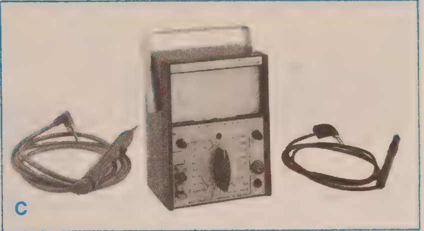
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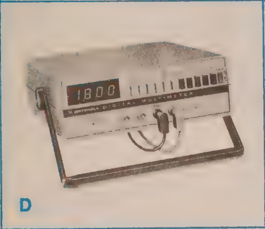
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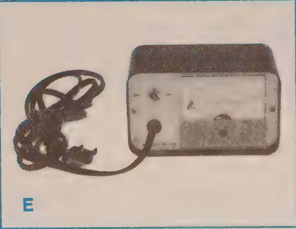
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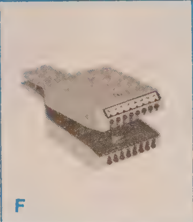

F

G

Variable Power Supply

A Variable dc output from 5-18 volts at 3 amps makes this power supply ideal for servicing low power circuits. Separate voltage and amp meters allow you to continuously monitor operating conditions. Regulation is ±0.5%, with ripple and noise less than 1.0 mV rms, short circuit protected. See appropriate Buyers' Guide pages or catalog sheet for complete features and specifications.

S-1360A	Variable Power Supply

Dual Trace Oscilloscope

B Ideal for visual communication and information display system servicing, this oscilloscope provides both TVH and TVV sync triggered sweep rates. A vertical band-width of DC to 15 MHz and a sensitivity of 5mv/cm are more than adequate for most service shop requirements. Input impedance is 1 megohm shunted by 25 picofarads. Features include: 24 nsec. risetime, 20 calibrated sweep speeds, a 5-inch CRT, calibration source and 5x magnification. For complete features and specifications see appropriate Buyers' Guide pages or catalog sheets.

R-1004A	Dual Trace Oscilloscope
R-1003A	Export version of above
RTL-4011A	X1 Probe Kit
RTL-4012A	X10 Probe Kit
RTL-4013A	X1/10 Switchable Probe Kit

FET VOM

C The Model R-1008A Solid-State, Volt-Ohm-Milliameter, with LP OHMS, offers an exceptionally wide range of measuring functions in a portable unit. This unit allows accurate measurement of 0.05V auto target setting under field and bench servicing conditions. It has been designed for ease of operation with an easy-to-use pushbutton selection of measuring functions. Frequency compensated from 50 Hz to 50 kHz and supplied complete with leads, alligator clips, batteries and instruction manual. See appropriate Buyers' Guide pages for complete features and specifications.

R-1008A	FET VOM

Digital Multimeter

D A very versatile instrument that offers wide-ranging capability at a low price. Highly reliable LSI circuitry features bi-polar operation and automatic zero. The unmistakable 3½" digit readout features 0.43" LED's. All ranges and functions are selected with convenient pushbuttons. Twenty-eight ranges are available. This unit may be powered by 110V ac or four "D" cells. An automatic battery charger is built in. Available extras include a rugged carrying case and accessory probes. See appropriate Buyers' Guide pages or catalog sheet for complete features and specifications.

R-1001A	Digital Multimeter

A-C Line Monitor

E The ST-860 is an expanded scale AC Voltmeter with 117V ac approximately center scale. The unit is equipped with an on-off switch and line cord. It is ideal for use where the line voltage varies or is questionable, as well as checking equipment performance at specific line voltages.

ST-860A	AC Line Monitor

Logic Monitor

F The most convenient and efficient way developed to check digital IC's. Clip it over any DTL, TTL, HTL or Cmos dip IC up to 16 pins. Each contact connects to a single "bit" detector with high-intensity LED readout, activated when the applied voltage exceeds a fixed 2V threshold. Logic 1 turns LED on; logic 0 (low voltage or open circuit) keeps LED off. A powerseeking gate network automatically locates supply leads and feeds them to the logic monitor. See appropriate Buyers' Guide page for specifications.

RTL-4015A	Logic Monitor

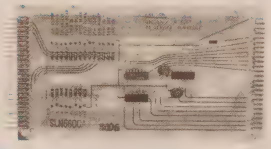
Logic Probes

G For detecting and indicating logic levels and the presence and polarity of single pulses of very short durations in Cmos, DTL, TTL, RTL logic circuits. Indicator lamps provide an immediate visual indication of the condition existing in the circuit under test for step-by-step logic state testing. Simply connect to 5V source and ground on the board being tested. See appropriate Buyers' Guide page for specifications.

RTL-4014A	Logic Probe

Digital Equipment Service Aids

A



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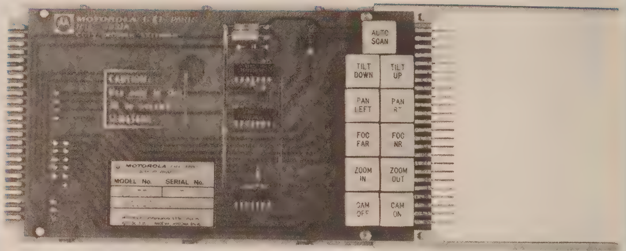


C

Extender Boards

A Used to service pc boards under operating conditions in the S-1264A and S-1267A encoder 2 wire control units, the S-1268A Decoder/Power Supply Unit, and IDS System.

Used in the S1264A - S1267A Encoder Control Unit:

SLN-6576A	Extender board for extending the SLN-6557A encoder board
TLN-5370A	Extender board for extending SPN-6110A reg. +5.8V power supply board, the SLN-6561A pan/tilt control board, the SLN-6563A zoom control board, the SLN-6564A focus control board, the SLN-6565A iris control board, the SLN-6566A site select readout board, the SLN-6571A universal encoder board, and the TLN-5011A digital clock board. Three TLN-5370A extender boards, are required, for servicing the SLN-6567A site select memory board, the SLN-6568A camera on/off board, the SLN-6589A camera on/off and site 1-10 select board and the SLN-6590A site 11-20 select board.

Used in the S1268A Decoder/Power Supply Unit:

SLN-6584A	Extender board for extending the SLN-6559A digital receiver board.
TLN-5158A	Extender board for extending the SPN-6109A zoom lens power supply board, the SLN-6560A multifunction decoder board, the SLN-6577A auto scan logic board, the SLN-6579A audio power amplifier board, the SLN-6591A audio intercom logic board, and the SLN-6580A universal decoder board.

Used in Information Display System

SMM-1108A	Extender board with 100 pin connectors for IDS.

Multifunction Decoder Service Board

B The Multifunction Decoder Service Board is used on 2-wire Decoder Unit S1268A to check both the SLN-6560A Multifunction Decoder Board and the SLN-6580A Universal Decoder Board(s). Its use will minimize troubleshooting time normally required to isolate a malfunctioning pushbutton control function (to a specific circuit board in the decoder/power supply unit). This is accomplished with the aid of twenty-two red LED's mounted on a plug-in type extender board. Eight of the LED's are mounted on the left side of the board, and labeled with the eight data bit line designators; 1-2-4-8-16-32-64-128. The remaining LED's are mounted on the right side of the board, and are labeled with fourteen standard pushbutton control functions as follows:

Iris Open/Iris Close, Focus Near/Focus Far, Zoom In / Zoom Out, Autoscan, Tilt Up/Tilt Down, Pan Left/Pan Right, Pass ID, and Cam On/Cam Off.

When a pushbutton for one of the control functions is depressed, the eight "data" LED's provide a composite visual indication of the (activated) control functions programmed 8-bit binary code. If the correct code is observed, it indicates that the control function has been received and decoded up to the input of the multifunction decoder board. If the correct code is **not** observed, conventional troubleshooting is required back to the input of the digital receiver board. Once the correct 8-bit code has been observed on the "data" LED's, the correct "control function" LED should light. If it does, it indicates that the pushbutton control function has been decoded properly by the multifunction decoder board. If the correct "control function" LED does **not** light, it indicates a malfunction on the multifunction decoder board.

The multifunction decoder service board may also be used to check the 8-bit binary codes (only) of the universal pushbutton control functions. This is possible because the eight data bit lines that are routed to the multifunction decoder board, from the digital receiver board, are also in parallel with the input to the SLN-6580A Universal Decoder Board(s). If the correct 8-bit universal code is observed on the "data" LED's, it indicates the malfunction to be on the universal decoder board(s), or with associated external components.

SLN-6600A	Decoder Service Board

Digital Decoder Function Service Board

C For use on 2-wire Digital Decoder Unit S1268A. Service board incorporates eleven pushbutton switches and built-in buffer and interface circuitry to allow a technician to perform manual functions at the **decoder site.** Functions are pan left-right, tilt up-down, zoom in-out, focus near-far and camera on/off. The service board allows quick system analysis of decoder operations.

To use, simply unplug the multifunction decoder board SLN-6560A from the J8 slot, plug-in the service board and then plug the multifunction decoder board into the top of the service board.

RTL-4031A	Decoder function service board

The Parts Department

of the Motorola Communications Group

Worldwide Marketing

Products developed exclusively for the world marketplace, like Spare-Pac spare parts kits, make it easier to establish and maintain communications networks in any part of the world.

MAV-PACK Training Programs

Build a Library of MAV-PACK Training Packages

MAV-PACK
MOTOROLA AUDIO-VISUAL PACKAGE
Technical Training Department
MOTOROLA INC

Today's fast developing radio communications technology means a continuing trend toward the exclusive use of transistors, integrated circuits and other exotic solid-state devices including widespread use of digital and logic circuits. Although these trends provide greater reliability and fewer failures, they also produce increased sophistication and complexity. While units may not fail as often, the technician *must* be more knowledgeable when they do fail.

The need for greater technical skills, coupled with the explosive growth in the number of radio communications systems in use, brings with it the urgent need for new and innovative training methods to upgrade present technicians and to train new technicians as quickly and as economically as possible. MAV-PACK Technical Training is the only training program available today which meets these needs.

- **Inexpensive . . . no non-productive travel time or expenses**
- **Convenient, always available when you need it**
- **Complete, thorough training**
- **Self-teaching . . . easy to use**
- **Upgrades Technicians**
- **Excellent background training . . . increases general technical knowledge**
- **Produced by training specialists in conjunction with new product design engineers**

MAV-PACK Technical Training Brings a Complete Program To Your Shop

Based on the latest audio-visual instruction techniques, MAV-PACK trains your technicians on specific Motorola products individually, or in groups, in your own shop. There is no need to postpone critical training on new products because of heavy work loads or unexpected emergencies, or wait for factory training schools to come to your area. You can conduct your own schools, in your own shop, or your technicians can train themselves during slack periods. *Remember, no matter how capable the technician may be, he still needs training on new products.*

Inexpensive

The cost of obtaining and maintaining a MAV-PACK library and the associated projection and audio playback equipment is nominal, when compared with the cost of sending technicians to schools located in distant cities. Unproductive travel time, traveling expenses and lodging costs are completely eliminated.

Training When You Need It

MAV-PACK is convenient, always available for immediate use anytime . . . on a work bench, a desk, or in an office. Use them to train your men *now* and have them on the shelf for future reference, refresher courses and training new men.

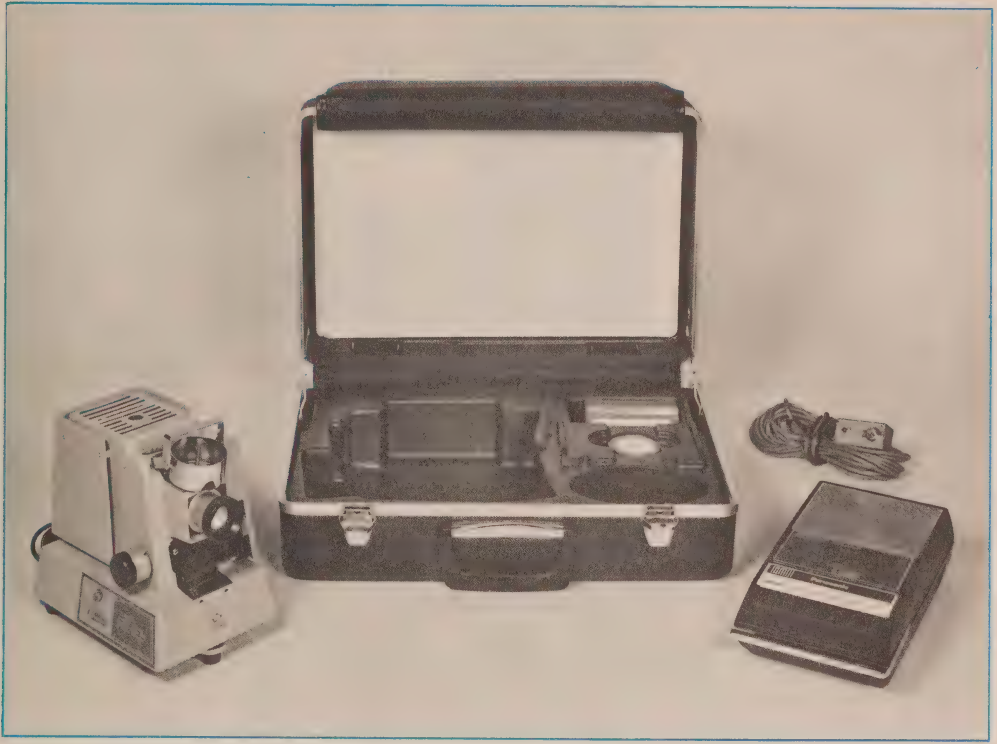
Integrated Audio-Visual Presentation

Studies indicate that we retain only 13% of an audio only (lecture) presentation, as against 88% with a combination of audio and visuals. MAV-PACK lets you *see* the equipment, circuits and servicing procedures, while you *hear* the instructor's voice. Each MAV-PACK consists of several standard cassettes narrated by a technical training specialist, a standard 35 mm color filmstrip, an examination and a sealed envelope with the examination answers.

In addition, each MAV-PACK contains two complete text books of reference material including a course outline and introduction, schematics, a section on theory, circuit analysis and servicing. Also included is a cassette "index-locator" to help locate a particular area of the cassette and filmstrip for repeated study. Note that while the textbook is a valuable reference, the filmstrip and cassette are an integral part of the course, making a complete audio-visual presentation. While many technicians will not read a text, or find it difficult to absorb printed material, they cannot help but learn from an integrated audio-visual program such as MAV-PACK.

To keep your training investment to a minimum, MAV-PACK was developed for use with the lowest cost manual filmstrip projector and any cassette play back unit.

Projector/Cassette Console



With MAV-PACK you set your own training pace. You can move rapidly through familiar or easy to understand subjects and dwell as long as you like on more difficult areas. You can even get instant replays and reviews when desired.

MAV-PACK Is Thorough

Prepared by Motorola training specialists, in conjunction with the engineers who design new products, each MAV-PACK is a complete technical training course on a specific product. It presents the theory of operation, detailed circuit analysis and required servicing techniques in an easy to follow, step by step, programmed presentation.

Stretch Your Manpower

Keep your service technicians abreast of new developments today with MAV-PACK. Train your technicians promptly on new products. It means an immediate boost in proficiency, productivity and morale . . . and top performance from new equipment.

MAV-333 Projector/Cassette Console

This handy new "suitcase" console is available for your convenience in using MAV-PACK audio-visual training packages. It consists of a high quality filmstrip projector and a cassette recorder-player packaged in an attractive, lightweight carrying case with a built-in projection screen for viewing by individuals or small groups. Significant features include an improved 500 watt projection lamp for brighter images and a separate speaker for improved audio quality. The sharp lens provides a large picture at relatively short projection distances. Electric film advance mechanism provides quick, positive action framing. A film-feed canister eliminates the need to rewind film. A 20-foot electric pushbutton film advance cord also provides remote control for stopping and starting the tape recorder/player.

Powered by standard 120V ac, the entire unit is also available in a 220V ac version. The recorder/player may be removed from the MAV-PACK carrying case and used anywhere on battery power. This integrated circuit recorder features a built-in microphone, automatic recording level, pushbutton operation and capstan drive.

MAV-333	500 Watt, 115 Volt, 60 Cycle Projector/Player-Recorder with Carrying Case
61-84031FO1	Optional 2″ lens for close-range viewing.
65-80324A11	Projector Lamp (For MAV-333) 500 Watt—115 Volts
65-84254C81	Projector Lamp (For MAV-300) 300 Watt—115 Volts
MAV-400	115/230 Volt, 50/60 Cycle Projector/Recorder with Carrying Case
65-80320A85	Projector Lamp 500 Watt—230 Volts

MOBILES

MOCOM 70 Mobile Radio U43, U51 & U53 BBN Series

MAV-PACK/TLA is two packages in one, covering both High & Low-Band MOCOM 70 Mobile Radios.

The High-Band section of the package covers the receiver circuitry from the antenna to the speaker and both 30 & 45-watt transmitters. Operation of the directional coupler and the associated transmitter protection circuitry is also explained.

The Low-Band section covers the complete operation of the EXTENDER Circuit receiver and the 50-watt transmitter. The final amplifier current limiter is also covered.

The PRIVATE-LINE Squelch encoder, reverse burst and decoder circuitry are covered in detail. These circuits are common to both High & Low-Band radios.

Other options that are included in this package are: the Time-Out Timer, the Control Head Light Dimmer and the Positive Ground Module. Special information regarding RF and audio troubleshooting makes the MAV-PACK/TLA a valuable training package on the MOCOM 70 Radio.

MAV-PACK/TLA

MICOR Low Band Mobile Radio T51-71 RTN Series

MAV-PACK/TLB covers the T51, 61, 71 RTN Series Low-Band MICOR Radios. The solid-state transmitter, receiver and tone squelch system are discussed in this package.

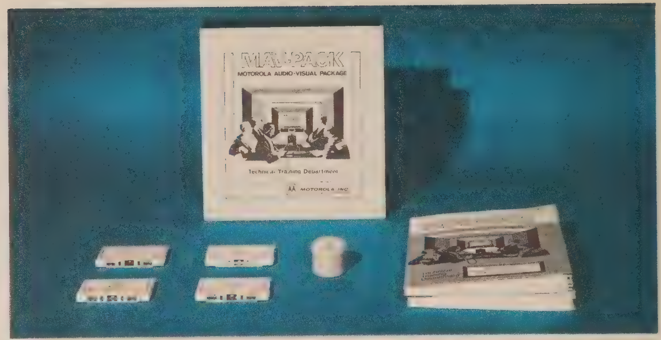
Circuit analysis, troubleshooting and repair techniques are described in detail, along with photographs taken of actual test and servicing procedures. New metering techniques developed for the MICOR Radio line are also explained.

MAV-PACK/TLB

MICOR High Band Mobile Radio T43-73 RTN Series

MAV-PACK/TMA provides complete theory and practical training on the High-Band MICOR FM Radio, the industry standard for mobile two-way communications. This audio-visual package provides, in logical steps, a detailed analysis of such circuits as crystal discriminators, serrasoid modulators and four-pole crystal filters.

MAV-PACK/TMA



MICOR Railroad Radios R43 RTE, RTA & RTH Series

MAV-PACK/TMA2 covers the Railroad MICOR Radio, 13.6 and 72-volt power supplies, the high end regulator with over-voltage protection and the all new transient filter.

The receiver and transmitter used in this radio are the same as those in the mobile High-Band MICOR Radio, which are covered in detail by MAV-PACK/TMA. Therefore, it is required that MAV-PACK/TMA be covered prior to TMA2.

Accessories and options such as the Control Head, Dynamic Headset, Mounting Rack, Channel Reverting, Automatic Light Dimmer, Tone Oscillator and the 13.6-volt Direct Board are covered in this package. Servicing techniques and test equipment are also presented in MAV-PACK/TMA2.

MAV-PACK/TMA2

MOCOM 35 Mobile Radio D33-43 CCN Series

MAV-PACK/TMB covers the MOCOM 35 Radio in every detail. The receiver section contains not only circuit operation, but also includes information on alignment and various operational checks. A section on crystal filter operation is also included.

In the transmitter portion, both 8 & 15-watt units are covered, including tracing the signal path in detail from the microphone to the antenna.

Of special interest is the servicing appendix, printed circuit repair hints, receiver servicing, stage gain charts and transmitter servicing hints. PRIVATE-LINE Squelch encoder and decoder servicing and a list of test equipment requirements are included in this section. MAV-PACK/TMB provides everything needed to familiarize the technician with the MOCOM 35 Radio.

MAV-PACK/TMB

PULSAR VHF Radiotelephone (TELCO)

MAV-PACK/TTA1 covers the Telco I.M.T.S. version of the VHF Mobile Radiotelephone.

The radio incorporates the use of a frequency synthesizer which is covered in detail in the Receive and Transmit Logic sections.

The explanation covers the Interconnect, Mixer, Audio and Receiver I.F. boards, and Transmitter RF circuitry. Also covered is circuitry unique to the PULSAR Mobile such as the Voltage Controlled Oscillators and Trisolector.

Special attention is given to the Supervisory board which contains the circuitry needed for signalling in the M.T.S. or I.M.T.S. mode of operation.

The last portion of the MAV-PACK is devoted entirely to alignment and troubleshooting of the PULSAR radio.

MAV-PACK/TTA1

PULSAR VHF Radiotelephone (RCC)

MAV-PACK/TTA2 covers the RCC version of the PULSAR Mobile, the FACTS Control Head and system operation. MAV-PACK/TTA1 is a required prerequisite for this MAV-PACK, which covers only the different circuitry used in RCC operation.

Each section of the MAV-PACK contains servicing and troubleshooting.

MAV-PACK/TTA2

Base Stations

MOTRAN 450 Radio, MOTRAC 450 Radio U34, 44 & 74 MST Series

MAV-PACK/TNA covers the unique MST Series 450 MHz FM Mobile Radio. In addition to its complete coverage of common circuits, such as IF and audio, special attention is given to several uncommon ones like ceramic thick-film striplines and automatic transmitter protection circuits.

Also provided in this audio-visual package is the conversion of the solid-state MST MOTRAN Radio to an MST MOTRAC Radio, with the addition of a ceramic tube final.

MAV-PACK/TNA

MICOR UHF Mobile Radio T34-T74 RTA Series

MAV-PACK/TNB covers the UHF version of the MICOR Series Mobile Radio. This radio contains new circuitry not found in other mobile radios. A three-port circulator is used in the antenna switching network of each radio. In addition, both the transmitter and the receiver frequencies are developed by circuitry using a single channel element. The RF power amplifier circuitry is constructed using thick-film microstrips upon alumina substrates and internally matched RF power transistors.

MAV-PACK/TNB covers the theory of operation and essential circuit analysis, which is necessary to understand and properly apply the troubleshooting and alignment procedures required for servicing of the UHF MICOR Radio.

In addition, information is contained in the text, explaining in detail how to troubleshoot and repair the RF circuitry used in the power amplifier section.

MAV-PACK/TNB

CD-100 European Mobile and Base Station Radios, VHF & UHF (English Language Version)

MAV-PACK/XMB covers the CD-100 Mobile and Base Station Radios in the VHF and UHF Bands. The filmstrip portion shows the CD-100 VHF and UHF dash and trunk mount radios and their components. To familarize the technician with the radio, callouts indicate where the different parts are located.

Schematics of the receiver and transmitter, with theory of circuit operation are provided. Troubleshooting charts and test equipment setup instructions are also included.

In addition to covering the available options for the radio, control options for the CD-100 Base Station are also discussed in detail.

MAV-PACK/XMB

BASE STATIONS

MICOR Radio Base Station Local Control C53-73 RTB Series

MAV-PACK/TCA1 is a complete package covering the Local Control High-Band version of the MICOR Radio COMPA-STATION Base Station. Included are the high performance solid-state transmitter and the SENSITRON Receiver. Complete coverage of the single conversion receiver is also found in this package.

The solid-state power supply, regulation and protection circuits are covered in detail, along with servicing techniques.

MAV-PACK/TCA1

450 MHz COMPA-STATION Base Station C64/74 MSB Series

MAV-PACK/TDA covers the Local and Extended Local Control models of the 450 MHz COMPA-STATION Base Station. Included are theory of operation, servicing measurements and procedures, and alignment techniques for the receiver, transmitter and power supply. All available accessories, such as the Emergency Power Reverting Kit, are thoroughly discussed.

This course provides the necessary information for servicing the RF portions of all 450 MHz COMPA-STATION Base Stations, regardless of the method of station control. A definite must to supplement and complement MAV-PACK/TYA, TYB and TXA.

MAV-PACK/TDA

Tone and DC Remote Control Consoles T-1600 Series

MAV-PACK/TGB covers the T-1600 Series of Tone and DC Remote Control Consoles. Theory of operation of both Tone and DC units is explained in detail. Also covered in MAV-PACK/TGB are some of the more popular accessory kits, such as the electronic clock kit.

In addition to circuit analysis, information on servicing the T-1600 Consoles is given. Both the filmstrip and the text contain valuable troubleshooting information.

MAV-PACK/TGB

Tone Remote Control for Base Station Module Circuits and Servicing

MAV-PACK/TXA covers the Tone Remote Control system using totally new modules and circuits which are not familiar to many technicians.

Theory of operation, servicing and repair of the numerous Tone Remote modules, using the TEK-38 module servicing adapter for bench repair, are covered in this MAV-PACK. This "universal package" applies to all tone remote control base stations, and is a "must" for technicians who install and repair the stations.

MAV-PACK/TXA

DC Remote Control for Base Station Module Circuits and Servicing

MAV-PACK/TYA thoroughly covers the DC Remote Control. It is a "universal package" because all DC Remote Control Base Stations, in all bands, use these same plug-in modules.

Circuit analysis, theory of operation and servicing techniques are covered. It also shows how to repair these modules on the bench in your shop, using the TEK-38 base station module servicing adapter.

MAV-PACK/TYA

Community and RT Repeaters Module Circuits and Servicing

MAV-PACK/TYB covers logic diagrams for all 11 possible plug-in modules used in these stations, making them easy to learn and service.

Full and detailed circuit analysis and servicing are covered for all modules, including the use of the TEK-38 out-of-unit servicing adapter.

A logic functional diagram is presented, showing the inter-connecting circuits for the modules, to permit easy tracing.

The series covered by the 11 modules are the TLN-1050, 1170, 1180, 1240 and 1250.

The RF portions of a Community Repeater are fully covered in MAV-PACK/TDA, 450 MHz COMPA-STATION Base Station. Where remote control is involved, either MAV-PACK/TYA for DC remote, or MAV-PACK/TXA for Tone remote, will cover the modules involved.

MAV-PACK/TYB

MICOR Base Station Control Modules

MAV-PACK/TYC covers all the standard MICOR Base Station Control Modules. The modules presented are applicable to Low-Band, High-Band and UHF Remote Control Base Stations.

Using functional diagrams, Tone, DC, and Repeater Control Modules are explained. The explanation of each module is related to its operation in the Remote Control Chassis as well as in the entire system.

In addition to the functional diagrams, a section on Maintenance and Line Level Setting Procedures is also included.

MAV-PACK/TYC

Paging

PAGING

PAGEBOY II VHF Radio Pager Tone-Only and Tone-and-Voice A03DNC Versions, with Accessories and Options

MAV-PACK/PPA covers the PAGEBOY II VHF Radio Pager with complete circuit analysis from the antenna to the speaker. The material is presented in a clear, stage-by-stage, easy-to-follow manner. The PAGEBOY II Pager's unique logic oriented decoder section is well presented, as is the section covering logic theory and symbology.

Included are complete circuit descriptions for the Group Call, MEM-O-LERT Deferred Paging and Sub-Audible Paging options. The single unit charger and vehicular charger circuits are also presented.

All necessary alignment procedures essential for peak performance are included in this package.

One section is devoted to the development of an efficient troubleshooting technique, by the presentation of proper methods for implementing and analyzing "performance checks" on the PAGEBOY II Pager.

To follow up the troubleshooting is a section presenting suggested repair techniques, graphically illustrating the removal and replacement of a PAGEBOY II Pager thick-film module.

MAV-PACK/PPA

PAGEBOY II Tone-Only Radio Pager A01CAC and A03CAC Series

MAV-PACK/PPA2 covers both high-band and low-band PAGEBOY II Tone-Only Radio Pagers and is an addendum to MAV-PACK/PPA.

MAV-PACK/PPA is a prerequisite for MAV-PACK/PPA2 and is necessary for a complete understanding of PAGEBOY II Tone-Only Pagers. Logic theory and symbology is not repeated in PPA2. The tone and voice high-band receiver, covered in PPA, is very similar in its circuitry to the tone-only high-band receiver. Therefore, special attention is given to the low-band pager circuits in MAV-PACK/PPA2.

The circuit analysis of the two-tone decoder pertains to both high and low-band PAGEBOY II Pagers. The latest servicing and troubleshooting techniques are discussed and apply to *all* PAGEBOY II Pagers.

MAV-PACK/PPA2

PAGECOM FM Radio Pager A03EAC Series

MAV-PACK/PPC covers the PAGECOM VHF Radio Pager, another of Motorola's innovations in paging receiver designs.

This package contains complete circuit descriptions of the unit's unique DUO-BOARD chassis construction. The receiver and audio amplifier-decoder printed circuit boards are both described. The audio amplifier-decoder circuit presentation, due to its logic circuitry, is further expanded upon by the addition of a section covering logic theory and symbology. A description of the Group Call option is also included.

All necessary alignment procedures and performance checks are presented to help you keep pager "down-time" to a minimum.

Also included is circuit information pertaining to the PAGECOM Pager single and five-unit master chargers.

Servicing techniques giving suggested methods for component removal can also be found in this package.

MAV-PACK/PPC

METRO-PAGEBOY Radio Pager A01MEC and A03MEC Series

MAV-PACK/PPD covers both the high-band and low-band five-tone METRO-PAGEBOY Radio Pagers.

A detailed circuit analysis from the RF amplifier to the audio transducer is presented in a stage-by-stage manner. Special attention is given to the closed loop decoder, comprised of four custom integrated circuits, using both bipolar and MOS technology. A section is devoted to logic theory and symbology that is used in the five-tone decimal-digital decoder.

Also included are alignment procedures, noise takeover measurements and stage gain measurements to simplify troubleshooting. Timing diagrams and actual oscilloscope waveforms, in conjunction with the logic diagrams, will help you to quickly become proficient in servicing the METRO-PAGEBOY Radio Pager.

MAV-PACK/PPD

PAGECOM FM Radio Pager A04EAC Series

MAV-PACK/PPE includes all information necessary to understand and service the PAGECOM UHF Radio Pager. This package contains complete circuit descriptions of the unit's DUO-BOARD chassis (receiver and audio amplifier/decoder). A section covering logic elements used in the decoder circuits is included to clarify circuit operation.

Special attention is given to the FM slope detector theory of operation. Unique servicing procedures required by this circuit are shown and explained.

Alignment procedures, performance checks and troubleshooting hints are presented to help analyze pager problems. Servicing techniques showing suggested methods for IC removal is also covered in this package.

MAV-PACK/PPE

PAGEBOY II VHF & UHF Tone And Voice Radio Pagers A03FNC and A04FNC Series

MAV-PACK/PPG has been produced to provide an understanding of concepts, principles and techniques required for servicing both the VHF and UHF PAGEBOY II FNC series radio pagers. This MAV-PACK combines circuit discussion, servicing information, and repair techniques between the two pagers, whenever possible, to minimize repetition. Separate sections for VHF and UHF RF receiver servicing are used because of the unique troubleshooting methods and different service aids required for these two pagers.

This MAV-PACK is arranged in a sequence to suit the instructional needs of the technician with a balance between theory of operation and servicing. The servicing sections explain receiver performance checks, stage gain measurements, and "noise takeover" procedures. Another section is devoted to servicing of the decoder, which includes information on audio waveforms, stage gains, overdrive and audio output measurements.

Repairing the pager requires some new tools and techniques and is discussed in depth. Module replacement, discrete component replacement, and transducer replacement is made easy by following the illustrated steps.

This training package will enlarge the technicians knowledge of paging receivers and increase his proficiency in servicing them.

MAV-PACK/PPG

MAV-PACK
MOTOROLA AUDIO-VISUAL PACKAGE
Technical Training Department

PORTABLES

HT-220/HT-100 HANDIE-TALKIE Radios H23FFN and H12FFN Series

MAV-PACK/PQA contains circuit descriptions and analysis, alignment procedures, the use of test equipment and test fixtures, and troubleshooting hints in a well organized audio-visual package. A detailed explanation of the audio complementary-symmetry amplifier and DC feedback loop are typical of just two of the circuits discussed throughout the receiver section.

The servicing section covers troubleshooting and explains how and when to make stage gain measurements. The repair section describes the required repair tools and how to use them. Each section complements the others, increasing the technician's knowledge and proficiency on the HT-220/HT-100 HANDIE-TALKIE Portable Radios.

The section showing how to make repairs to PC boards and the tools used, can be applied to PC boards in other units.

MAV-PACK/PQA

450 MHz HANDIE-TALKIE Radio HT-220 Series

MAV-PACK/PQB covers the 450 MHz series of the HT-220 HANDIE-TALKIE Portable Radios, plus many model variations. Besides covering the basic 1-watt, 450 MHz HT-220, this package covers the 4-watt unit, the PRIVATE-LINE Squelch encoder version and selective call models. A complete description of battery chargers including the "fast charge" unit is contained in this MAV-PACK.

A particularly complete servicing section is included, containing alignment, troubleshooting and repair techniques; all well illustrated on the filmstrip.

MAV-PACK/PQB is a necessary tool for technicians who service and maintain the 450 MHz HT-220 HANDIE-TALKIE Radio.

MAV-PACK/PQB

HANDIE-COM High Band Portable Radio MH-10 and MH-70 Series

MAV-PACK/PQC covers the MH-10, 1.5-watt and MH-70, 2 and 5-watt HANDIE-COM High Band Radios. The universal and PRIVATE-LINE Squelch encoder versions are covered with the same detail as the basic models.

The HANDIE-COM High Band Radios use three FET's in the front end and in addition, the MH-70 makes use of the monolithic crystal filter in the high IF. All of these circuits and more are covered in detail.

Theory of operation and essential circuit analysis necessary for a good understanding and efficient use of the servicing section are presented in this package. The servicing section contains alignment, troubleshooting and repair techniques.

Supplementary information is contained in the text on junction Field Effect Transistors and logic symbology.

MAV-PACK/PQC

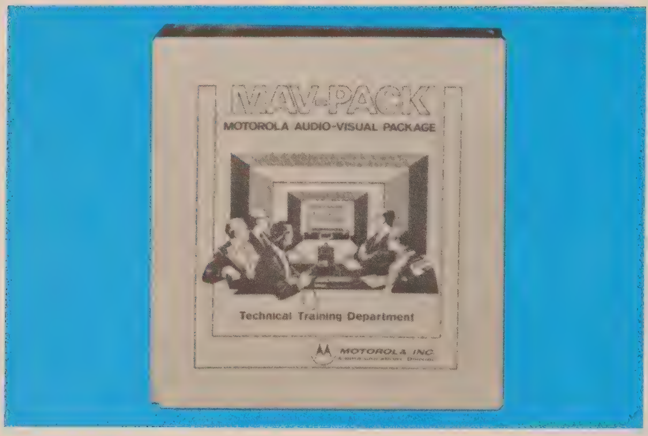
MAV-PACK For "MX 300" Radios

MAV-PACK/PQD is designed to aid technicians servicing VHF and UHF "MX 300" series HANDIE-TALKIE portable radios. The theory of operation of the "MX 300" series radio circuitry, troubleshooting practices, and professional repair techniques are thoroughly covered. "MX 300" series radios feature advanced, solid state microelectronic circuitry in the form of plug-in modules. The modules represent 90% of the electronics, which speeds and simplifies servicing. These points and many more are included in this MAV-PACK. The theory of operation section includes a description of each module, its function, and its equivalent electrical circuit represented by logic symbols. For those technicians not familiar with logic symbols and those technicians who wish to review, MAV-PACK XXA, Integrated Circuits and Logic Fundamentals, is recommended.

The servicing portion of the program includes the use of service aids, alignment procedures, troubleshooting practices, and repair techniques. A discussion of soldering tools and techniques completes the servicing section.

MAV-PACK/PQD

Accessory Equipment



ACCESSORY EQUIPMENT

CHANNEL SCAN Monitor and QUIK-CALL II Mobile Paging

MAV-PACK/AXA is a bonus package, combining two widely used MOTOROLA optional accessories in one package. The T1150 series CHANNEL SCAN Monitor and QUIK-CALL II Mobile Paging are accessories used with MOTRAC, MOTRAN, MOCOM 30 and MOCOM 70 Mobile Radios. The theory of operation, circuit analysis and servicing techniques of both products will enable the service technician to efficiently maintain them. This package covers the use of the TEK-42 Test Set for testing the CHANNEL SCAN Monitor on the bench, without the radio and cables. This section covers the 2 of 2, 2 of 4 and 4 of 4 circuits.

The QUIK-CALL II Mobile Paging section covers the two and four-reed versions.

MAV-PACK/AXA

MICOR SYSTEMS 90 Radio Accessory Group (Part 1) CHANNEL SCAN Monitor and Singletone Encoder

MAV-PACK/AXB1 covers two of the comprehensive MICOR SYSTEMS 90 Radio Accessory Group options; CHANNEL SCAN Monitors, selectable priority and selectable non-priority versions; and the Singletone Encoder, one-tone and five-tone versions.

For easier understanding of these new, extensive circuits, functional logic diagrams have been developed for both accessories. In fact, 13 frames are devoted to training on logic circuits and, in addition, an extensive Logic Appendix is added to the textbook.

Priority sampling is demonstrated by the instructor. Full circuit analysis and servicing techniques, including how to use the TEK-42 CHANNEL SCAN Monitor Test Set, are covered.

MAV-PACK/AXB1

MICOR SYSTEMS 90 Radio Accessory Group (Part 2) Voice Privacy Adapter, QUIK-CALL II Mobile Paging Decoder and Multiple PRIVATE-LINE Squelch Encoder

MAV-PACK/AXB2 covers three of the MICOR SYSTEMS 90 Radio Accessory Group Options; Voice Privacy Adapter (mobile speech scrambler); QUIK-CALL II Mobile Paging Decoders, two-reed and four-reed versions; and Mobile Multiple PRIVATE-LINE Squelch Encoders, four-tone and eight-tone versions.

The package is divided into three sections, one for each accessory. Each section will provide system explanations, functional logic diagrams and schematic presentations. The text also contains a Logic Appendix to be used as a review of logic symbols and operation.

By ordering both parts of the MICOR SYSTEMS 90 Radio Accessory Group instruction, MAV-PACK AXB1 and AXB2, you can have quick, convenient training on five major MICOR Radio Accessories.

MAV-PACK/AXB2

Closed Circuit Television Fundamentals

MAV-PACK/VVA1 is designed to familiarize the technician with Motorola Closed Circuit Television equipment.

The package begins with an explanation of basic television principles. In this section, the production of the composite video signal is thoroughly discussed.

Following basic TV principles is a section on Cameras and Monitors. Operation of both standard and Low-Light Level cameras is explained.

A section on CCTV Accessories is also included. In this section is information on video switchers, video tape recorders and other associated equipment.

MAV-PACK/VVA1

CCTV SYSTEM Installation and Maintenance

MAV-PACK/VVA2 covers all the necessary fundamentals needed to install and service a CCTV System.

The Installation Section contains information on cable, camera, monitor and accessory installation principles.

In the Maintenance Section, both system and equipment servicing techniques are presented. The System Troubleshooting Section deals with common problems arising in the installation of new CCTV Systems. Also in the Maintenance Section is a review of camera and monitor circuit operation.

The Camera Servicing Section includes the step-by-step procedures concerning camera alignment on both standard and Low Light Level Cameras.

It is suggested that the technician reviews MAV-PACK VVA1 prior to starting this MAV-PACK.

MAV-PACK/VVA2

Integrated Circuit and Logic Fundamentals

MAV-PACK/XXA has been produced as an aid to technicians who are required to maintain an ever-increasing number of products containing integrated circuits. Examples of topics covered by this MAV-PACK are:

Basic Functions and Circuits—covers the simpler gates and circuits built from these gates.

Complex Functions and Circuits—covers the more complex gates and circuits built from these gates.

Specialized I.C.'s—covers I.C.'s with specific functions.

Logic Families — covers the internal makeup of different types, or families, of I.C.'s.

Servicing—covers test equipment and test procedures, repair procedures and ways to follow logic diagrams.

This package is designed to build a very sound foundation in integrated circuits and logic for any technician.

MAV-PACK/XXA

The Parts Department
of the Motorola Communications Group

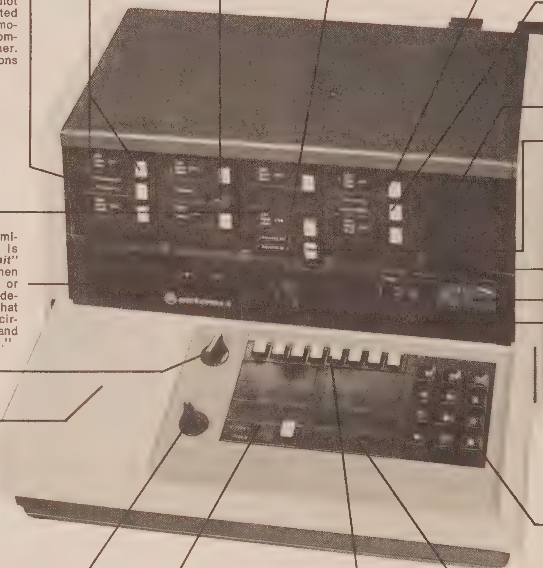
Computer Control

U.S. based computer facilities control inventories and track all orders through the Parts Department's Lombard, Illinois warehouse. Computer displays in all U.S. Area offices can indicate the exact status of all domestic orders in seconds.

Fingertip Remote Control

Features and Options

For T-1617BM Control Console



Optional Repeater Control Switch Kit (TLN-1656A or TLN-1660A) enables operator to set up a wire-line-controlled RT repeater in either the repeater mode or the remote station mode of operation. During the day, the system can be operated as a remote station and during the night, when the console operator is not on duty, it can be operated as a repeater so that mobiles can remain in communication with each other. (Single frequency stations only.)

Standard
Call Light
Mute Switch
*Busy Light

Optional Individual Volume Control Kit (TLN-1654A) provides the operator with a means of individually setting the audio level of each channel supplied with this option to the unselected speaker. Aids in setting message priorities.

Unselect Speaker Volume Control

Optional Speaker Mute Switch (TLN-1498A) allows the receiver audio to be reluced to a predetermined level . . . especially useful during continuous monitoring.

Optional Receiver Monitor On/Off Switch Kit (TLN-1638A) for tone control channels allows continuous monitoring of a selected channel to seek open time during periods of heavy usage. The receiver is reverted to carrier squelch operation by returning this switch to the ON position.

Unselect Speaker: Monitors all unselected channels.

Optional Squelch Min/Max Switch Kit (TLN-1637A) effectively increases an individual receiver's operating range (when that station is selected) by allowing operator to reduce squelch level to pick up weak incoming signals. Operate at normal squelch levels at other times to avoid excessive noise levels. Availabe for tone control channels only.

Location of Channel Option Kits

Green pilot lamp illuminates when console is turned on. ***Red "transmit"* pilot lamp** illuminates when the mic. push-to-talk or console xmit sw. is depressed to indicate that the transmit control circuits are energized and the microphone is "live."

On-Off Switch

Select Speaker

Digital Electronic 12/24 Hour Clock provides precise time at a glance for accurate logs.

VU Meter provides a continuous visual indication of audio line levels.

Clock Set Controls

Optional "Touch-Tone" Encoder Module (TLN-1667A) provides (1) selective call, group call, or all-call for similarly-equipped mobiles (2) selective call to another dispatch point over the intercom, (3) dial (with Phone Patch option) into land line "Touch-Tone" systems, (4) "ready light" for the console operator, and (5) set up rf links in a large system.

Select Speaker Volume Control

Optional F1-F2 Switch Kit (TLN-1480A)

Permits the operator to choose either frequency of the selected channel's two-frequency base station transmitter.

Channel Select Switches

Location of System Option Kits

*(when Busy Lite Board) installed

Additional Options (Not Shown)

Five Frequency Singletone Encoder (TLN-1505A) Permits selection of one to five frequencies plus off position. Standard tone frequencies are 1350, 1500, 1650, 1800, and 1950 Hz. Other frequencies available on special order (TLN-1549A).

Remote Console Phone Patch (TLN-1671A) Permits interconnection of simplex 2-way radio control point into telephone company network. Requires protective network and special telephone set ordered from telephone company.

Wild Card I or II Switch Kit (TLN-1657A or TLN-1658A) Provides remote control of any non-radio on/off function at or near the base station site. Two "Wild Card" options are available to match corresponding kits in existing base stations.

All Mute Switch Kit (TLN-1649A) Allows the operator to mute to a predetermined level all unselected receive audio by pressing the "ALL MUTE" switch.

Paging Control Kit (TLN-1502A) In paging systems, this option automatically disables the coded squelch tone when the channel is used with a paging encoder. This option is for use on single-frequency channels only (necessary only with dc control).

DC Busy Light Kit (TLN-1650A) Gives the console operator a visual indication that parallel equipment is transmitting by detecting the presence of positive DC line currents on the control line. This is an FCC requirement for a control point with parallel remote dispatch points. Use of this module also gives the lockout and crossmute functions associated with the busy light.

DC Paging Busy Light Kit (TLN-1651A) Same operation as TLN-1650A except this module also detects the negative line currents on the control lines when paging tones are sent.

Tone Busy Light Board (TLN-1652A) Gives the console operator a visual indication that parallel equipment is transmitting by detecting the presence of low level 2175 Hz Guard Tone on the control line. This is an FCC requirement for a control point with parallel remote dispatch points. Use of this module also gives the lockout & crossmute functions associated with the busy light.

Digital Encoder Boards (TLN-1661A or TLN-1702A) Telephone-dial-operated digital encoder (1500 Hz or 2805 Hz) allows selective calling of appropriately-equipped mobiles. Eliminates bothering of other mobiles with calls not intended for them.

Individual Line Level Control Kit (TLN-1653A) This option provides eight separate under-the-panel controls for individual adjustment of each channel's TRANSMIT audio level.

Handset/Hangup Option (TLN-1515A) Allows the operator to conduct a conversation with greater privacy. Selected receiver audio is routed to the handset when off hook; to console speaker when on cradle.

Intercom Switch (TLN-1481A) Permits two-way intercommunications between remote control points, dispatcher points, and base station.

Alert Tone (TLN-1492A) Announces an incoming voice transmission at the remote transmitter site and serves as a convenient test-tone for system adjustments.

Transmit Switch (TLN-1477A) Use in addition to or in place of desk stand microphone transmit switch as desired. Illuminates red transmit indicator.

Monitor Switch (TLN-1478A) (Illuminated) Used in addition to or in place of desk stand microphone monitor switch.

4-Channel Supervisory/Main-Standby Switch Kit (TLN-1662A) One bank of four switches allows operator to have either supervisory control or main-standby on as many as 4 different channels. Must be used with junction box and relay kits.

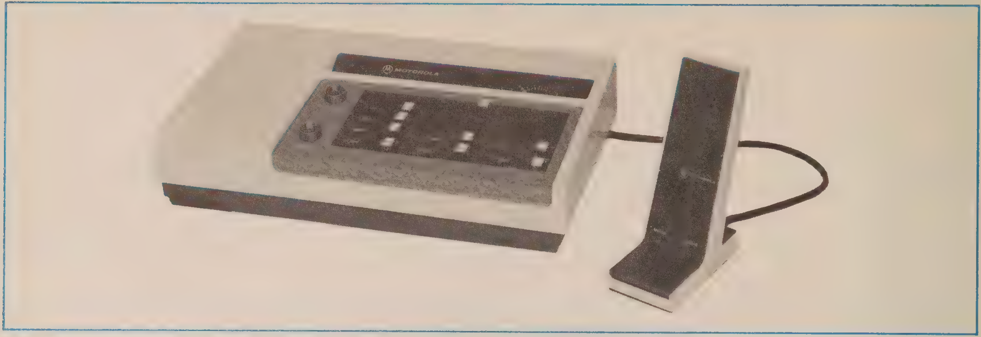
8-Channel Supervisory/Main-Standby Switch Kit (TLN-1665A) One bank of eight switches allows operator to have either supervisory control or main-standby on as many as 8 different channels. Must be used with junction box and relay kits.

Junction Box (TLN-1663A) Provides a more convenient means to connect phone lines to equipment or to allow supervisory control or main-standby option to be used on a channel. Connections for microphone paging encoders and other signalling equipment are also provided by the junction box.

Relay Kit (TLN-5057A) One relay required for every 2-wire channel on which either supervisory control or the main-standby option is required. Is installed in junction box.

Mute Receiver Two-Switch Kit (TLN-1655A or TLN-1659A) This switch enables the operator to mute the secondary receiver of a two-receiver base station when that station is selected. Since receiver #1 priority is automatic with this type of Motorola base station, this switch can serve to turn off the second receiver for periods of the day or night when it is not wanted. On tone control channels, muting or unmuting of receiver 2 is a manual operation. On dc control channels, receiver #2 remains muted until transmission is made on F2.

Tone and DC Remote Control Consoles



These unique units provide complete fingertip remote control of your entire radio system. Light emitting diode indicators let you see your operational status at a glance. All *solid-state design* and a fully enclosed housing assures unmatched reliability.

Solid State Models

Both dc and tone control models are available. DC control requires a dc two-wire telephone line between base station and console. Tone control will operate with any audio quality telephone link i.e. telephone line, r-f repeater, or microwave.

Standard equipment on all units includes panel-mounted volume control, five-inch loudspeaker, built-in dispatcher-monitor capability, "transmit" pilot lamp, on/off switch, ac power pilot lamp, adjustable compression amplifier and control line regulation on dc control models. Two or more consoles can be operated "in parallel" or remote or local desk sets may be added to serve as additional radio "dispatch" points in other offices or departments.

Dual voltage input models allow you to operate from a 12-volt dc battery power source in an emergency . . . to retain vital system control when you're likely to need it most.

Models for Standard Squelch

TONE CONTROL	DC CONTROL	DESCRIPTION
T-1604BM	T-1606-BM	117/VAC/12VDC with mic., Select options below.
T-1604BML72	T-1606BML72	Same as above but without mic.
	T-1600BM	117VAC only with mic., select options below.
	T-1600BML72	Same as above but without mic.
	T-1607BM	117VAC/12VDC with mic & 2 freq. transmit options., (Select options below)
	T-1607BML72	Same as above but without mic.
	T-1601BM	117VAC only with mic. & 2 freq. transmit options., (Select options below)
	T-1601BML72	Same as above but without mic.

Models for "Private-Line" Squelch

TONE CONTROL	DC CONTROL	DESCRIPTION
T-1605BM	T-1608BM	117VAC/12VDC with mic., select options below.
T-1605BML73	T-1608BML73	Same as above but without mic.
	T-1602BM	117VAC only with mic., select options below.
	T-1602BML73	Same as above but without mic.
	T-1609BM	117VAC/12VDC with mic. 2 & freq. transmit options., (select options below)
	T-1609BML73	Same as above but without mic.
	T-1603BM	117VAC only with mic. & 2 freq. transmit options., (select options below)
	T-1603BML73	Same as above but without mic.

NOTE: For 120/220/240VAC 50/60Hz power option add L131 to model number. Consult your Motorola Representative when ordering this option less microphone.

Control Point Options

TONE CONTROL	DC CONTROL	DESCRIPTION
TLN-1482A	TLN-1482A	Supervisory switch
TLN-1484A	TLN-1488A	Line operated xmit light
TLN-1505A	TLN-1505A	Five frequency single tone encoder (standard freq.)
TLN-5157A	TLN-5157A	Same as above but (specify freqs. needed)**
TLN-1485A	TLN-1485A	Remote console phone patch.
TLN-1490A	TLN-1490A	4-wire audio adapter
TLN-1481A	TLN-1481A	Intercom switch
TLN-1492A	TLN-1492A	Alert tone (not compatible with TLN-1505A)
TLN-1489A	TLN-1489A	VU meter
TLN-1521A	TLN-1519A	Paging supervisory kit & line operating*
TLN-1504A	TLN-1504A	Speech scrambler
	TLN-1503A	Remote repeater control*
TLN-1501A	TLN-1501A	Paging control (used with Lo9 series)
TLN-1513A	TLN-1513A	Junction box (for connecting T-1370, 1 & 3 desk or wall set)
TLN-5057A	TLN-5057A	Relay kit

**Do not order 2100Hz or 2250Hz with tone console.

Operator Convenience Options

TONE CONTROL	DC CONTROL	DESCRIPTION
TLN-1486A	TLN-1486A	12/24 hour Digital reading clock, 50/60 cycle
TLN-1477A	TLN-1477A	Transmit switch
TLN-1498A	TLN-1498A	Speaker mute
TLN-1478A	TLN-1478A	Private-line switch
TLN-1479A	TLN-1479A	Emergency power alerting
TLN-1500A	TLN-1500A	Emergency power switch
TLN-1480A		F1, F2 switch
TLN-1493B	TLN-1499A	Mute receiver #2*
TLN-1515A	TLN-1515A	Handset w/hang up switch (TLN-1478APL monitor sw req'd for PL consoles)

Unique System Options

TONE CONTROL	DC CONTROL	DESCRIPTION
TLN-1483A	TLN-1483A	Alternate line
TLN-1494B		Wildcard module console #I*
TLN-1495B		Wildcard module console #II*
TLN-1496B		Squelch control console module*
TLN-1496B		Operate "PL" receiver module*
TLN-1496B		Repeater control module*
TLN-1510A		Disable "PL" transmit module
TLN-1497A	TLN-1502A	Paging "PL" control
TLN-1507A		Pushbutton accessory switch, (provides 4 independent form "C" contacts) tone or DC.
TLN-5370A		Extender card (used in servicing without disabling unit)

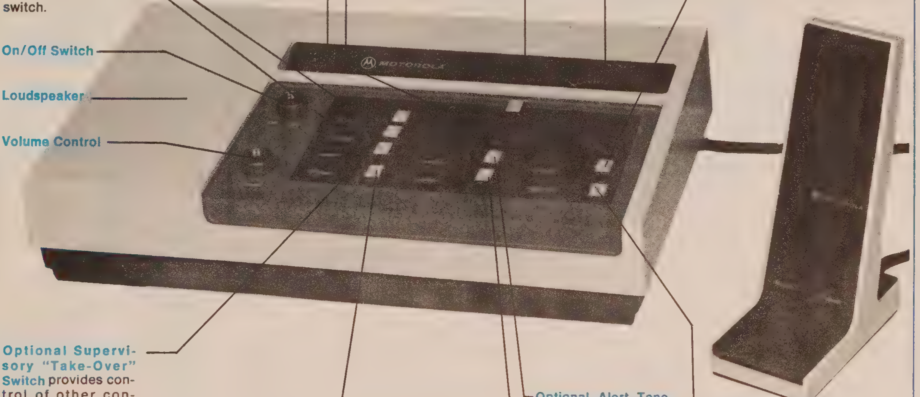
*In case of a remote station being controlled by more than one remote control console, only 1 can have any of these options.

NOTE: TLN-1496A can be used for several different functions. The kit number appears several times as each function is listed separately.

Ordering Remote Control Consoles: Because of system consideration, it is always advisable to contact your Motorola Radio Communications Representative when ordering these units. He will be happy to supply you with further information and assist you in integrating these units into your radio system.

Fingertip Remote Control

Features and Options



Optional Alternate Line Control switches output to a second line allowing control of alternate "stand-by" station.

Optional "Private-Line" Monitor Switch (illuminated) used in addition to or in place of desk stand microphone monitor switch.

Green pilot lamp illuminates when console is turned on. Red "transmit" pilot lamp illuminates when the mic. push-to-talk or console xmit sw. is depressed to indicate that the transmit control circuits are energized and the microphone is "live."

Optional F1-F2 Switch (tone control models only) permits remote control of two-frequency base station. Optional xmit "PL" on-off switch on T1-tone models allows operator to disable "PL" transmit for extended periods, especially useful in paging applications.

Optional Digital Electronic 12/24 Hour Clock provides precise time at a glance for accurate logs.

Optional VU Meter provides a continuous visual indication of audio line levels.

Optional Transmit Switch used in addition to or in place of desk stand microphone transmit switch as desired. Illuminates red transmit indicator.

On/Off Switch

Loudspeaker

Volume Control

Optional Supervisory "Take-Over" Switch provides control of other consoles, remote desk sets, or local desk sets on the same control line. Required by FCC regulations for systems with more than one operating point.

Optional Mute Receiver No. 2 allows operator to mute the secondary receiver on two-receiver base stations.

Optional Intercom Switch permits two-way intercommunications between remote control points, dispatcher points, and base station.

Optional Alert Tone announces an incoming voice transmission at the remote transmitter site and serves as a convenient test-tone for system adjustments.

Optional Speaker Mute Switch allows the receiver audio to be reduced to a predetermined level . . . especially useful during continuous monitoring.

Additional Options

(Not Shown)

Optional Five Frequency Singletone Encoder permits selection of one to five frequencies plus off position. Standard tone frequencies are 1350, 1500, 1650, 1800, and 1950 Hz. Other frequencies available on special order.

Optional Remote Console Phone Patch permits interconnection of simplex 2-way radio control point into telephone company network. Requires protective network and special telephone set ordered from telephone company.

Optional 4-Wire Audio Adapter permits separate transmitter and receiver audio paths or in a 2-receiver station, permits separate line audio path for 2nd receiver.

Optional Line Operated Transmit Light Kit causes red transmit lamp to illuminate when the transmitter is keyed by any parallel-connected remote control console, remote control desk set, or local desk set connected to a parallel-connected console.

Optional Emergency Power Alerting Kit causes the console green "on" light to flash to indicate that the console has automatically switched to emergency power.

Optional Wild Card Switch Kits (illuminated) (tone control models only) provide on-off or two function control to turn auxiliary equipment "on" or "off" at or near base station site.

Choose One of Three. (Tone control models only.)

Optional Repeater Control Module permits operator to setup wire line controlled "RT" repeater to operate as either a repeater or a base station, commonly referred to as repeater "set-up" and "knock-down."

Optional Squelch Control Console Module allows operator to select one of two pre-set squelch levels.

Optional Operate "Private-Line" Console Module allows operator to turn receiver "Private-Line" "on" or "off" for extended periods.

Remote Desk Sets
Local Wall Set

A

B

Tone Remote Desk Sets

A Complete facilities for remote operation of a carrier-squelch or "Private-Line" tone-coded squelch base station. It may be used as the "Control Point" operating position when used alone or as a "Dispatch Point" when connected in parallel with other remote desk sets. The basic unit has a built-in speaker, volume control and a transmit indicator lamp. Available in your choice of five decorator colors: White, Beige, Green, Red and Black.

T-1381A*__ Basic model, includes speaker, volume control and transmit indicator lamp.

T-1382A*__ Basic model plus intercom switch, and "Private-Line" monitor switch.

T-1383A*__ Basic features plus intercom switch, "Private-Line" monitor switch and F1-F2 frequency selector switch.

Local Wall Sets

B Permits control of a base station over a multi-conductor cable up to 100 feet in length. Ideal where desk space is limited or unavailable. This unit may be used for "Extended-Local" control of your system, or as an additional "dispatch point" in conjunction with a Remote Desk Set or a Remote Console. The unit includes a volume control, a "Private-Line" monitor switch and a transmit indicator lamp. The handset has a push-to-talk bar in the handle. Control cable and junction box same as for Series-80 local control desk set.

T-1373A Includes volume control, transmit lamp and "Private-Line" monitor switch (10½"H x 5¾"D x 5¼"W) BLACK ONLY.

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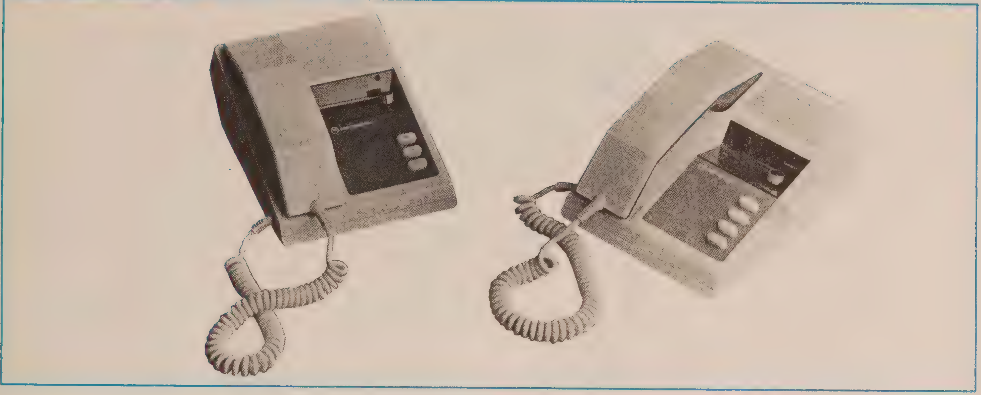
*Color choices are: black, red, green, beige, white. Specify color by suffix letter—example: Model No. T-1381AB is a red desk set.

Color	Black	Red	Green	Beige	White
Suffix Reference Letter	A	B	C	E	F

"Series 80" Desk Top Controllers DC Remote and Local Control



"Series-80" Desk Sets

The new "Series-80" Desk Set provides features and options never before available in desk sets. A new era of compact desk top controllers is dawning with the flexibility of modern styling, package models for easy ordering, field changeable colors, and new avenues of D.C. Remote Control. Basic models are equivalent to the traditional desk set series (see chart in this section). The "Series-80" Desk Set presents a new level of excitement in desk top systems.

D.C. Remote Control Desk Sets

FEATURES

D.C. Remote Control is now provided using two approaches. MRC (Mid Remote Control) a new concept, provides base station control when the wire line pair is controlled by the user within his facility. Minimal line loss (3 dB max) is a requirement. Expensive recurring phone line charges are eliminated. This approach provides the control of base stations within 4000 feet of the controller and is a natural for single or multi-building complexes.

TRC (Total Remote Control) is applicable when leased telephone lines are required. Automatic Gain Control (A.G.C.) in the receive mode allows for base station control at distances greater than 4000 feet.

Single Base Station Operation: All "Series-80" Desk Sets are single channel solid state units. They each contain an internal speaker, volume control, transmit indicator light, PL monitor switch, and handset. A push-to-talk switch is located on the side of the handset for one-hand operation.

Duplex Intercom: Duplex Intercom is an all new standard feature. No activation switch is required. No talk-listen interrupt. Simply pick up the handset and talk as on a telephone.

Parallel Operation: "Series-80" Desk Sets may operate in parallel with up to 5 additional control devices.

Local Control Desk Sets

Features

The "Series-80" Local Control Desk Sets provide local or extended local base station control over a multi-conductor cable up to 400 feet in length (100 feet if more than 1 controller is used). Two versions of the local desk set are available: basic models which are not option expandable and accessorized models which are expandable with field installed options.

Local desk sets include a volume control, an internal speaker, transmit indicator light, monitor switch, and handset. The push-to-talk switch is provided on the side of the handset for one-hand operation.

Duplex Intercom: Duplex Intercom is an all new standard feature. No activation switch is required. No talk-listen interrupt. Simply pick up the handset and talk as on a telephone.

Expandable Models

Alternately field installed options may be added to a fully expandable model. Only field installed options are available from Communications Parts. Factory installed options are available through your Motorola representative. Complete descriptions of all options and accessories are given on the following pages.

Package Models

In addition to the standard features indicated above, package models are available with various combinations of optional features. These include a digital clock, supervisory control, alert tone, two-frequency control, line operated transmit light, 240V ac operation, standby switch, emergency power switching capability, and mute receiver number two capability.

Digital Clock

The solid-state electronic digital clock provided with some package models and all expandable models is supplied as a 24 hour, 60 Hz clock. The unit can be converted to 12 hour and/or 50 Hz operation by simply cutting jumper wires.

Licensing Regulations

Parallel Dispatch Point Systems

Radio licensing regulations often require that, unless licensed as separate control points, all parallel units must operate as dispatch points through a designated control point unit. This unit must have (1) a Supervisory Control Switch to take over control from all parallel dispatch points, and (2) a Line Operated Transmit Light that lights whenever the transmitter is keyed. Note that several Series-80 desk set package models incorporate these control features.

"Series 80" Desk Top Controllers DC Remote and Local Control

"Series 80" Desk Top Controllers Package Models available from Communication Parts

Note: All "Series-80" Desk Top Controllers supplied by Communication Parts are shipped with shadow bronze decorator inserts. For other colors order optional decorator inserts from chart.

Local Desk Sets

T-1903AA	Unpowered Desk Set
T-1903AB	Unpowered Desk Set w/supervisory switch
T-1904AC	117V ac powered desk set w/clock
T-1904AH	117V ac powered desk set w/clock and alert
T-1904AK	117V ac powered desk set w/clock and supervisory switch

Mid Remote Control Desk Sets

T-1901AA	Desk set without clock
T-1901AC	Desk set w/clock
T-1901AD	Desk set without clock with F2 switch
T-1901AE	Desk set w/clock and LOTL*
T-1901AF	Desk set w/clock and standby switch
T-1901AG	Desk set w/clock and 120/240V ac input power
T-1901AH	Desk set w/clock and alert
T-1901AJ	Desk set w/clock, LOTL* and standby switch
T-1901AK	Desk set w/clock and supervisory switch
T-1901AL	Desk set w/clock and F2 switch
T-1901AM	Desk set without clock; with emergency dc to dc power converter
T-1901AN	Desk set without clock, with emergency dc to dc power converter and F2 switch
T-1901AP	Desk set w/clock, LOTL* and supervisory switch
T-1901AQ	Desk set w/clock, F2 switch, and supervisory switch
T-1901AR	Desk set w/clock, F2 switch, and LOTL*
T-1901AS	Desk set w/clock, F2 switch, and mute switch
T-1901AT	Desk set w/clock, F2 switch, supervisory switch and LOTL*

Total Remote Control Desk Sets

T-1902AA	Desk set without clock
T-1902AC	Desk set w/clock
T-1902AD	Desk set without clock, w/F2 switch
T-1902AE	Desk set w/clock and LOTL*
T-1902AF	Desk set w/clock and standby switch
T-1902AG	Desk set w/clock and 120/240V ac input power
T-1902AH	Desk set w/clock and alert
T-1902AJ	Desk set w/clock, LOTL* and standby switch
T-1902AK	Desk set w/clock and supervisory switch
T-1902AL	Desk set w/clock and F2 switch
T-1902AM	Desk set without clock, w/emergency dc to dc power converter
T-1902AN	Desk set without clock, w/emergency dc to dc power converter and F2 switch
T-1902AP	Desk set w/clock, LOTL* and supervisory switch
T-1902AQ	Desk set w/clock, F2 switch and supervisory switch
T-1902AR	Desk set w/clock, F2 switch and LOTL*
T-1902AS	Desk set w/clock, F2 switch and mute switch
T-1902AT	Desk set w/clock, F2 switch, supervisory switch and LOTL*

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*Line Operated Transmit Light

Fully Expandable Basic Models

(Order options separately for field installation)**

T-1881A	MRC (Mid Remote Control) Model (120V ac)
T-1881A/220V	Same as above except 220V ac
T-1882A	TRC (Total Remote Control) Model (120V ac)
T-1882A/220V	Same as above except 220V ac
T-1884A	Local Control Model (120V ac)
T-1884A/220V	Same as above except 220V ac

Fully expandable basic models include a solid-state electronic digital clock in addition to all of the standard features offered on the package models.

**Factory installed options available through your Motorola representative.

Optional Decorator Inserts

Escutcheon Part Number Chart

	Shadow Bronze	Red	Green	Blue
1 Switch	13-84228L09	13-84228L21	13-84228L29	13-84228L37
2 Switch	13-84228L10	13-84228L22	13-84228L30	13-84228L38
3 Switch	13-84228L11	13-84228L23	13-84228L31	13-84228L39
4 Switch	13-84228L12	13-84228L24	13-84228L32	13-84228L40

Complete sets of decorator inserts may be ordered with the following kit numbers. Each kit includes four escutcheons, of the same color, to cover various desired options.

TRN-8403A	Red insert kit
TRN-8404A	Green insert kit
TRN-8405A	Blue insert kit

The proper insert may be determined as follows:

All "Series-80" desk sets require at least one switch (for the Private-Line-monitor function). *An additional switch is added for each of the following functions.*

F2 Switch.
Standby Switch.
Alert.
Supervisory Switch.
Mute Switch.

Additional switches are *not* required for the following functions.

Clock
LOTL (Line Operated Transmit Light)
120/240V AC Input Power
Emergency AC to DC Power Converter

EXAMPLES:

T-1901AA	Desk Set Without Clock: 1 Switch
T-1901AE	Desk Set With Clock and LOTL: 1 Switch
T-1901AH	Desk Set With Clock and Alert: 2 Switches
T-1901AS	Desk Set With Clock, F2 and Mute Switch: 3 Switches

T-1300 Series DC Remote and Local Desk Set Replacements

Orders for T-1300 series dc remote and local desk sets will be replaced with equivalent "Series-80" desk sets according to the following reference.

T-1300 Series Model	"Series-80" Replacement
T-1370A	T-1903AA
T-1371A	T-1903AB
T-1375A	T-1902AA
T-1376A	T-1902AA
T-1377A	T-1902AD
T-1378A	T-1902AM
T-1379A	T-1902AM
T-1380A	T-1902AN

"Series 80" Desk Top Controllers DC Remote and Local Control

Optional Field Installed Kits for DC Remote Control Desk Sets

Field installed options are plug-in boards. Simple jumper wires provide alternate options.

Two-Frequency Base Station Control

Two-Frequency Transmit Control switch allows operation of dual frequency base station transmitters. Mute Receiver 2 switch allows full or partial muting of the secondary receiver, which can then be unmuted by transmitting momentarily on the secondary frequency. Note: The base station can be equipped with Receiver #1 priority for automatic muting.

TLN-1921A F2 Switch Kit

TLN-1922A Mute R2 Switch Kit

Alert Tone, Supervisory Control, and Main-Standby Switch

Three functions are provided by this kit. An alert switch provides a nominal 1000 Hz tone that can be used as an alerting device prior to a voice transmission. A supervisory switch permits the control point desk set operator to take over control from other parallel-connected consoles or desk sets. A main-standby switch enables the operator to select either the main or standby base station in a redundant configuration by selecting an alternate set of audio/control lines. A supervisory switch and a main-standby switch cannot be incorporated in the same desk set.

TLN-1917A Alert tone, supervisory control, and main-standby switch kit.

Line Operated Transmit Light and Line Continuity Sensor

The line operated transmit light provides the operator with a visual indication when other parallel-connected consoles, desk sets, or paging equipment are keying the transmitter.

The line continuity sensor assures the operator that the control line to the base station is not open by illuminating the transmit indicator during a transmit condition. Both functions may be provided by the kit. In addition a cross-mute circuit to eliminate interference between adjacent parallel control points is provided as part of the line operated transmit light circuit.

TLN-1923A Line operated transmit light and line continuity sensor kit.

Emergency Power Capability

Allows the operator to manually switch to battery (11 to 16 volts) operation during failure of ac primary power.

TLN-1915A Emergency Power Switch Kit

AGC Receive Amplifier

Automatic Gain Control (AGC) receive amplifier converts MRC desk sets to TRC capability. (AGC Amplifier standard on TRC desk sets.) AGC amplifier equalizes the level of audio received from distant and nearby parallel remotes and the base station.

TLN-1920A AGC Receive Amplifier Kit

Optional Field Installed Kits for Local Control Desk Sets

The supervisory control and alert tone options are also available for local control desk sets. Operation is identical to that described above for remote control desk sets.

TLN-1918A Supervisory Switch Kit
TLN-1919A Alert Tone Switch Kit

Accessories

Local Control Cables

Control cables are provided in convenient standard lengths of 25, 50, 75, and 100 feet.

For Desk Sets Without Supervisory Control

TKN-6346B	25 feet	**TKN-6348B**	75 feet
TKN-6347B	50 feet	**TKN-6349B**	100 feet

For Desk Sets With Supervisory Control

TKN-6350B	25 feet	**TKN-6352B**	75 feet
TKN-6351B	50 feet	**TKN-6353B**	100 feet

Mid Remote Control Cable

The recommended cable for MRC, DC Remote Control Desk Sets is an AWG #22 stranded, shielded twisted pair. Maximum recommended length is 4000 feet with a maximum line loss of 3 dB.

30-83128H01 AWG #22 stranded, shielded twisted pair (order by running foot)

Junction Boxes

A junction box is required when more than one local desk set is used in a system. The junction box provides the interface between the host equipment and the desk sets' speakers to prevent overloading the amplifier. It also provides a convenient tie point for up to six dispatch point desk sets, one control point desk set, and the remote control console or base station equipment.

TLN-1513A For Interfacing with T-1600 series
TLN-1218B Remote Control Consoles
For use with Consolette and "Compa-Station" base radios

Service Extender Cables

This cable kit includes eight, 4 pin extension cables which can be used as a service aid for both remote and local desk set products. The cables are used to extend plug-in option boards from their normal chassis positions to facilitate access to components.

BKN-6015A Service Extender Cable Kit

Surge Protection Kits

Power line and telephone (audio/control) line surge protection kits are recommended to protect against transient voltages including voltages induced by lightning. Kits are installed external to desk set.

RRX-4017A Power line surge protector with screw terminal wiring block for 117V ac, 10 Amp line.

RRX-4018A Similar to RRX-4017A but with standard 3-prong plug and receptacle in place of screw terminal wiring block.

RRX-4020A Similar to RRX-4017A but designed for 220/240V ac, 30 Amp circuits.

RRX-4019A Plug-in Power Line Surge Protector designed for use on standard 117V ac, 15 Amp single phase duplex convenience receptacles.

RRX-4021B Telephone line surge protector.

"Series 80" Desk Top Controllers

Performance Specifications

General

Model:		**D.C. Remote Desk Set (T1881, T1882, T1901, T1902 Series)**		**Local Desk Set (T1884, T1903, T1904 Series)**
Power Input 120V ac nom (96 to 144V ac):	Transmit	11 watts		7 watts max. (T1884 & T1904 only)
	Receive	14 watts		
	Standby	8 watts		
Power Input 13.8V dc nom (+11 to +16V dc):	Transmit	750 mA.		35 mA. (T1903 only)
	Receive	400 mA.		
	Standby	200 mA.		
Control & Function:		1 Freq Systems	2 Freq Systems	
	F1 Transmit	+12.5 mA.	+5.5 mA.	P-T-T closure "Private-Line"/"Digital Private-Line" Monitor closure Supervisory closure (optional)
	F2 Transmit	N/A	+12.5 mA.	
	"Private-Line"/"Digital Private-Line" Monitor	−2.5 mA.	−2.5 mA.	
	Mute R2	N/A	−5.5 mA.	
Weight:		2 kilograms (4.4 lbs.)		1.8 kilograms (4 lbs.)
Size:		3000 cubic cm. (183 cubic in.)		3000 cubic cm. (183 cubic in.)
Temperature Range:		−30°C to +60°C		−30°C to +60°C

D.C. Remote Desk Sets (MRC & TRC):

Transmit

Microphone Inputs:	Ceramic microphone cartridge and built-in preamplifier
Sensitivity:	−10 dBm @ 1000 Hz for rated line output
Frequency Response:	+1, −3 dB @ 300-3000 Hz (1000 Hz reference)
Signal-to-Noise Ratio:	Greater than 50 dB at rated output
Audio Output:	+11 dBm max. (adjustable) at less than 3% distortion into a 600 ohm load from 96V to 144V ac input

Receive

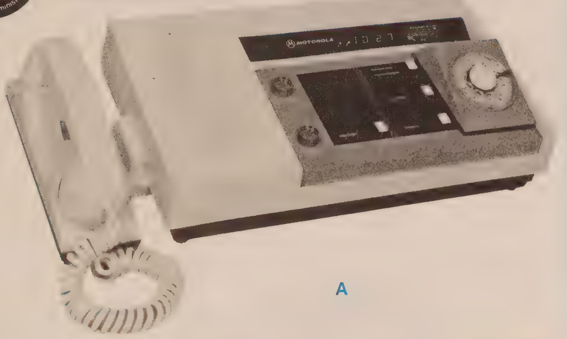
Inputs:	600 ohm line balanced
Audio Input Sensitivity With AGC:	−25 dBm @ 1000 Hz max. adjustable
Without AGC:	−6 dBm @ 1000 Hz max. adjustable
Frequency Response:	+1, −3 dB @ 300-3000 Hz (1000 Hz reference)
AGC:	Output level increases less than 3 dB with an audio input increase 30 dB above the AGC threshold (TRC Models only)
Signal-to-Noise Ratio:	Greater than 50 dB at rated output
Audio Output:	1 watt minimum into an 8 ohm load with less than 5% distortion with 30 dB of AGC from 96V to 144V ac input

Local Desk Sets

Microphone Type:	Ceramic cartridge
Preamplifier Output:	−10 dBm into a 600 ohm load
Speaker Size:	60 mm by 90 mm
Speaker Input Impedance:	4 ohms
Speaker Power Rating:	3.5 W
Handset Receiver Element:	PM Speaker, 8 ohms impedance

Remote Control

Digital
Hospital
Emergency
Administration Radio



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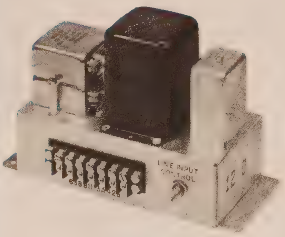

B

HEAR System Remote Control Consoles

A This is the main control unit in the HEAR Radio System. The unit is fully transistorized for highest reliability, designed for maximum operating ease and is as simple to use as a telephone.

Digital HEAR Radio System tone and dc consoles are compact, solid-state units providing all the control functions necessary to operate an FM two-way radio base station. All control facilities between the remote control console and the controlled base station are accomplished via audio control lines.

All models operate from a 120 VAC, 60 Hz power source or an emergency dc power source of 12 to 32 volts. Switchover to dc operation is automatic if the standby battery voltage is between 12 and 16 volts. For battery voltages over 16 volts, manual switchover is provided by an emergency power switch kit.

Models for "Private-Line" Squelch

TONE CONTROL	DC CONTROL	DESCRIPTION
T-1612B	**T-1610B**	Local area console (single frequency)
T-1613B	**T-1611B**	Regional console (two frequency)

Local Desk Set

Includes Volume Control and Transmit Lamp. "Private-Line" Disable Switch in Handset Cradle assures that the "Private-Line" is disabled the moment the Handset is lifted. Local Desk Set has an intercom feature and can be used as a "Dispatch Point" in any "Hear" System. (Beige Only)

T-1372A	Local Desk Set

Local Desk Set Accessories

TKN-6419A	Cable Kit connects Local Desk Set to Remote Control Console (100'). Order 1 per Desk Set.
TLN-1513A	Junction Box provides a tie point for up to four local desk sets connecting into a "Control Point" Remote Control Console. Includes cable to connect to Remote Control Console.

Digital/HEAR Remote Control Options

TONE CONTROL	DC CONTROL	DESCRIPTION
TLN-1482A	**TLN-1482A**	Supervisory switch kit
TLN-1481A	**TLN-1481A**	Intercom switch kit
TLN-1484A	**TLN-1488A**	Line operated transmit light kit
TLN-1479A	**TLN-1479A**	Warning light kit
TLN-1500A	**TLN-1500A**	Emergency power switch kit
TLN-1486A	**TLN-1486A**	Clock kit
TLN-1489A	**TLN-1489A**	VU meter kit
TLN-1541A	**TLN-1541A**	Emergency switch kit
TLN-1542A	**TLN-1517A**	Multiple console kit
TLN-1545A	**TLN-1545A**	F1-F2/area region switch kit
	TLN-1544A	Mute receiver 2/region off switch kit
TLN-1490A	**TLN-1490A**	Four-wire audio kit
TLN-1494A		Wildcard I switch kit
TLN-1495A		Wildcard II switch kit
TLN-1546A		Receiver-1 on-off/area on-off switch kit
	TLN-5057A	Relay kit
TLN-1507A	**TLN-1507A**	Accessory switch kit
TLN-1515A	**TLN-1515A**	Handset-hangup kit

Remote Control Chassis

B These Remote Control Chassis allow local control "Compa-Station," CONSOLETTE, desk top and ac utility base stations to be operated by a remote control console. They are operated by a dc control voltage from the remote control console via a 500/600 ohm control line.

Both the TLN-1126A and the TLN-1127A Remote Control Chassis contain a TLN-8571A Transient Suppressor Kit and a TLN-8572A Remote Control Unit. In addition, the Model TLN-1126A contains a TLN-8575A "Private-Line" Disable Relay and a TLN-6299A Terminal Bracket Kit.

The TLN-1128A 2-frequency model consists of the TLN-8571A Suppressor Kit and the TLN-8573A 2-frequency remote control unit.

Shelf mounting or mounting on the underside of a table is recommended for all the installations except "Compa-Station" models which allow mounting inside the housing. Side mounting on desk top cabinet base station models is also possible.

MODEL	BASE STATION RECEIVER TYPE
TLN-1126A	"Private-Line," 1 Frequency
TLN-1127A	Carrier Squelch, 1 Frequency
TLN-1128A	Carrier Squelch, 2 Frequency

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Emergency Medical System

Typical Front Control Group

Rear Control Group

Emergency Medical System

The Emergency Medical System (EMS) is an accessory group, compatible with Motorola "Systems 90" "Micor" Radio Set accessories. The System is used to provide a second, or rear, radio set control point as required in many emergency vehicle radio systems. Two different accessory groups are available: one group provides "hands-free" operation using a headset and a footswitch which permits the operator to perform other duties with his hands and still effect radio communications; the other group uses a handset which requires the operator to use his hands to effect radio communications.

The Emergency Medical System features two modes of radio set transmitter control, front or both front and rear. In either mode, the radio set frequency selection and the radio receiver squelch control adjustment are made only at the front operator location. The volume of received messages is independently adjustable at both operator locations to suit the level required by each operator.

In the front mode of operation, only the front operator can transmit outgoing messages while in the front and rear mode of operation either operator can transmit outgoing messages. Additionally, while operating in the front and rear mode, the priority of outgoing transmissions can be established with jumpers to provide front priority or rear priority. The operator that has transmit priority can automatically override the other operator's in progress transmissions, if necessary, by initiating his own transmission.

The Emergency Medical System includes an audio monitoring feature which allows each operator to hear the other operator's outgoing messages. This feature, together with the normal receiver monitoring that is routed to each operator, provides complete communications information. This allows the operators to react immediately and independently of each other to emergency situations, as they occur.

Order replacement parts below.

TLN-1614A	Rear Control Module field replacement kit. Incudes TLN-5554A Rear control board and TLN-5555A Escutcheon and hardware.
TLN-5552A	Transfer Board
TLN-5553A	Escutcheon & pushbutton
TKN-6689A	Transfer Cable
TLN-5554A	Rear Control Board
TLN-5555A	Escutcheon & pushbutton
THN-6125A	Housing (Rear Control Group)
TLN-5556A	Mounting bracket and hardware, rear control group.
TKN-6690A	Rear Control Cable (20 feet)
TLN-5558A	Squelch Board
TLN-5557A	Footswitch used with rear control group for "hands-free" operation.
TMN-6090A	Headset & Preamplifier
TLN-4505A	Hang-up Cup
TMN-6067A	Handset

Ordering Complete Systems: For complete Emergency Medical System contact your Motorola representative.

Microphones, Foot Switches

New Style Desk Microphone

A Desk microphones are designed to be used with the MICOR COMPA-STATION, remote control consoles and other similar equipment plus MAXAR base radios. All models contain preamplifier circuitry and a dual action transmit switch. "Private-Line" squelch models also contain a dual action monitor switch. This switch, when activated, disables the "Private-Line" feature in tone-coded squelch equipment, allowing the operator to monitor the channel before transmitting.

Both the transmit and monitor switches are mounted to allow easy operation when the microphone is either handheld or used on a desk.

All electrical components are mounted on a single printed circuit board vertically mounted in the housing, with cartridge at the top and the switches at the bottom. For connection to external equipment, a 9-foot stranded cord with spade-lug termination is routed out through the back at the base of the housing.

TMC-1004A	Desk mic for standard squelch MICOR radios. (With preamplifier and 9 foot cable terminated with 7 spade lugs.) (Also replaces TMN-1000A)
TMN-1005A	Desk mic for use with "Private-Line" squelch MICOR radios. (With preamplifier and 9 foot cable terminated with 7 spade lugs.) (Also replaces TMN-1001A)
TMN-1008A	Desk mic for use with "Private-Line" squelch MAXAR radios.
TMN-1009A	Desk mic for standard squelch MAXAR radios.

Transistorized Amplifier Models

B High output, uni-directional dynamic microphones with transistorized amplifier in microphone base to boost microphone output to normal transmitter input level. For use with units normally equipped with a carbon microphone or a transistorized dynamic military microphone, including the AC Utility and "Compa-Station" base stations.

Output impedance is 500 ohms. Output voltage is 0.25 volts, with normal voice input. Input power required is 7 ma. at 4 VDC. Measures 9½ x 5¾ x 5" wide. All models have 7 ft. stranded cord.

TMN-6007A	Transistorized desk stand mike for standard squelch units. (With preamplifier and 4-prong plug.)
TMN-6016A	Transistorized Desk Stand Mike. Has compulsory monitor function before transmit. Use with "Private-Line" Dual Squelch systems. (With preamplifier and 4-prong plug.)

Dynamic Floating Arm Microphone

C TU-587 Unidyne floating arm microphone leaves operator's hands free. Has moving coil element for full range voice frequency response. Uni-directional coverage minimizes pick-up of background noise. Impedance range adjustable to meet system requirements. A 4-prong connector, a 6-prong connector, and spade lugs are supplied with a 12-foot cable. Requires pre-amp kit for use with equipment now using a microphone with built-in pre-amp and foot switch or an external "transmit" switch.

TU-587	Unidyne floating arm microphone.
TLN-1167A	Transistorized pre-amp kit.
45-831428	Replacement floating arm for TU-587
50-821522	Replacement microphone for TU-587

Microphone Models (Less Preamplifier)

A low ouptut, uni-directional desk stand dynamic microphone for use with all Motorola locally controlled base stations having a preamplifier and also for use with the T-1200 series and FSC series remote control consoles.

Output impedance is 100 ohms, output voltage 0.01 volts with normal voice input. Unit measures 9½ x 5¾ x 5" wide. Both models have 7 ft., 4-conductor stranded cord and 6-prong connector.

TU-532A	Desk Stand Microphone (without preamplifier) (For standard squelch systems)
TMN-6017A	Desk Stand Microphone with compulsory monitor function before transmit. (Without preamplifier.) (Replaces TU-533A.)
P-7246	6-pin to 4-pin connector adapter for use with PA-8270 series remote control units. (Used with TU-532A, TMN-6017A.)

Motorola Foot Switches

D Heavy duty foot switches now available in two new models. Particularly helpful for operating personnel that must have both hands free to record information or handle papers while transmitting. Single pedal model for standard squelch systems, dual pedal model for dual-squelch "Private-Line" systems.

TLN-6377A	Foot Control Switch, Single
TLN-6287B	Foot Control Switch, Double

Microphones

Motorola . . . High-Impact Plastic Transistorized Mobile Dynamic Microphone

Dynamic elements provide sharp, clear messages • Self-contained transistorized preamplifiers strengthen voice signal and reduce noise

The microphones listed are palm-type dynamic units with transistorized preamplifiers. The preamplifier is an integral part of the cartridge. Each microphone includes a coiled cord, a four-prong microphone connector, and a built-in push-to-talk switch.

The dynamic element incorporated in these microphones provides fidelity inherently greater than that of carbon microphones. Superior voice quality is retained by amplifying the voice signals in the transistorized preamplifier before these signals become subject to the influence of noise due to stray electrical fields. This results in a high signal-to-noise ratio and high output. The preamplifier derives its operating power from the standard microphone voltage supplied by the associated Motorola radio equipment. The nominal output of these dynamic microphones with preamplifier is the same as that of carbon microphones.

The dynamic cartridge (with built-in preamplifier) and the sealed push-to-talk switch of weatherproof Model TMN-6018A is housed in a corrosion-proof high-impact plastic case. The microphone is rainproof, splashproof and dustproof. The case minimizes the effect of severe shock and vibration. This microphone is used in exposed locations.

SPECIFICATIONS

Power Requirement: 7 ma @ 4 VDC • **Output Impedance (Nominal):** 500 ohms • **Output Voltage (Nominal):** 0.165 Volt ± 3 db (to provide ⅔ maximum transmitter deviation) • **Dimensions:** 4″ h x 3″ w x 2″ d.

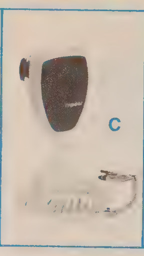
MODEL standard	**TMN-6013A**	**TMN-6049A**	**TMN-6054A**	**TMN-6055A**	**n.a.**	**n.a.**	**n.a.**	**TMN-6020A**	**1-80720A65**	**TMN-6019A**	**TMN-6104A**
weatherproof	**TMN-6018A**	**n.a.**	**n.a.**	**n.a.**	**NMN-6006A**	**NMN-6032A**	**NMN-6043A**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
APPLICATION	"Motrac," "Motran" & "Mocom•70" Mobile Radios	"Mocom•10" Mobile Radio	"Micor" Mobile Radio	"Mocom•35" Mobile Radio	Motorcycle "Dispatcher" Mobile Radio	Industrial "Dispatcher" Mobile Radio	Industrial "Dispatcher" Mobile Radio ("Private-Line" models)	Base Station Test Mike	Standard Mobile	Business Dispatcher	"Maxar" Mobile Radio
APPLICABLE HANG-UP SWITCH KITS with "PL" Disable Function	TLN-4445A has switch function to disable "PL" without coming "Off-Hook"	TLN-8695A	TLN-4346A has switch function to disable "PL" without coming "Off-Hook"	TLN-4416A			microphone includes automatic "PL" disable				
TERMINATION	4-prong connector	4 spade lugs	5-prong molded connector	5-prong connector	4-prong connector	6-prong connector	6-prong connector	4-prong connector	4 spade lugs	Solder-in	4-pin contact
CORD	12 inch tinsel coiled cord				8 inch tinsel coiled cord			12 inch stranded cord	12 inch tinsel cord	12 inch tinsel cord	12 inch tinsel cord
MOUNTING	hang up clip order 1-16241 Standard or 1-851093 Spring Loaded.										

For additional microphones see portable section.

Microphones and Handsets

A

B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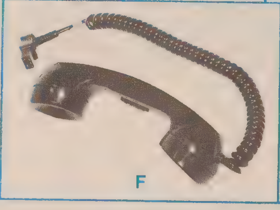
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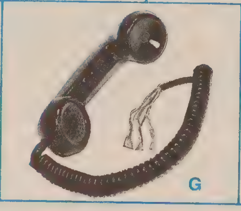
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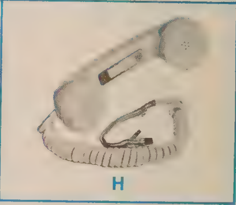
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MOCOM-10 Microphones

High impact plastic microphone; dynamic type. Standard Motorola styling. Color: Stellar Blue, used with latest "Mocom•10" mobile radio manufactured 1970 and later.

TMN-6049A Microphone

To use the improved TMN-6049A microphone with earlier "Mocom•10" models order PK-510 which includes TMN-6049A and all necessary components for conversion.

PK-510 Microphone and conversion kit

Plastic microphone with ceramic cartridge (not shown). Color: Stellar Blue used with "Mocom•10" models manufactured prior to 1970.

PK-469 for wired-in type applications
I-80704B49 for pin tip terminal type

Noise Cancelling Microphone

Ideal for high Ambient Noise Areas.

A This is a "noise cancelling" palm type microphone which contains a carbon granule microphone element. The microphone has a built-in "push-to-talk" switch. The 12 inch coiled cable terminates in a 4 contact plug.

P-7255A Noise Cancelling Microphone

Carbon Microphone

B Carbon microphone w/standard 4-pin connector, 12" stranded coiled cord and hang up button (metal housing).

TMN-6011A Carbon Microphone

MODAR, TRITON Microphone

C The same high quality as Motorola transistorized microphones . . . dynamic element with self-contained transistorized preamplifier for a high signal-to-noise ratio and high output.

TMN-6068A	MODAR, TRITON microphone (4 pin-tips), standard white coiled cord.
TMN-6103A	MODAR, TRITON microphone with heavy duty black coiled cord.
1-80751B99	Black coil cord, terminals, and push-to-talk switch used in TMN-6013A and available for use in adding heavy duty cable to TMN-6068A.

MICOR Microphone Adapter Plug

D The TEKA-74 adapter plug permits the use of the MICOR microphone with MOTRAC circular, four-conductor receptacles.

TEKA-74 MICOR to 4 Prong Microphone Receptacle

Railroad, Mobile and Portable Handsets

E Handset for railroad radio units (Carbon type) 6 prong plug.

TMN-6001A

Handset for railroad radio units (Dynamic type) 6 prong plug.

TMN-6002C

Handset microphone for railroad radio applications (Carbon type) 4 prong plug.

TMN-6003A

Handset for railroad radio units (Dynamic type) 4 prong plug.

TMN-6004B

Dynamic Handset with 4 prong plug for mobile use. (Replaces TU-475.)

TMN-6006B

Handset microphone for use with "Handie-Talkie" portable radiophones. (Replaces NU-129.)

NMN-6007A

Handset for use with "PT" series "Handie-Talkie" portable radiophones.

50-82433G01

F Handset for use with "Micor" radio.

TMN-6057A

Dynamic Handset, black for emergency medical systems and UHF MICOR radio duplex systems.

TMN-6067A

G Dynamic Handset with 5 conductor coil cord terminated in 5 spade lugs.

I-80723A03

H (6 pin tips) "Modar", "Triton" Handset.

TMN-6069A

Handset w/cord similar to (D) with 5 spade lugs. New remote and HEAR consoles.

TMN-6070A

MAXAR Microphone and Handset

B Microphone for MAXAR radio.

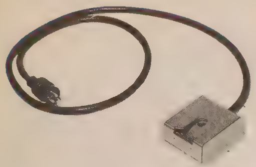
TMN-6104A Microphone

G Handset for MAXAR radio.

TMN-6113A Handset

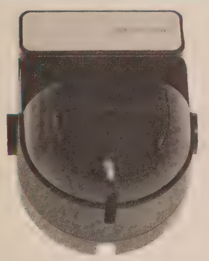
For additional microphones see portable section.

Hang-Up Switch Boxes and Clips


TLN-6526A

TLN-4504A

TLN-4346A
and
TLN-4445A


TLN-4505A

1-16241

1-851093

TRN-6319A

TLN-4787A

Hang-Up Switch Boxes are wired for operation with Motorola Dual Squelch "Private-Line" mobile two-way radio sets. These hang-up switch boxes provide automatic switching to the carrier squelch circuit when the microphone or handset is picked up.

Hang-Up Clips

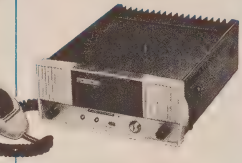
1-16241	Standard clip.
1-851093	Spring-loaded clip. Spring tension holds microphone in clip.

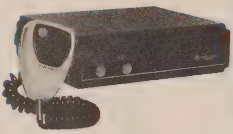
HANG-UP SWITCH BOX MODEL	HANG-UP FACILITIES FOR	CABLE TERMINATION	APPLICATION
TU-526	Handset	Pin-Tip	Rear Mount Radio Set
TLN-6145A	Handset	Pin-Tip	MOCOM•30 Mobile Radio
TLN-6146A	Microphone	Pin-Tip	Rear Mount PRIVATE-LINE Radio Only
TLN-6246A	Microphone	Pin-Tip	MOCOM•30 & MOTRAC Radio PRIVATE-LINE Rear Mount
TLN-6526A	Microphone	5 Pin Plug	Business DISPATCHER PRIVATE-LINE Radio 25-50 & 152-174 MHz only
TLN-8695A	Microphone	Pin-Tip	MOCOM•10 Mobile Radio
I-80781A81	Microphone	Pin-Tip	MOCOM•10 Base Station
TLN-4346A	Microphone	Pin-Tip	MICOR Radio
TLN-4436A*	Microphone	Pin-Tips	MOCOM•30 & Business DISPATCHER (450-470 MHz only).
TKN-6486A		Plug	
TLN-4445A	Microphone	Pin-Tips	Hang-up box includes switch for PL disable for MOCOM, MOTRAN, MOTRAC
TLN-4504A	Handset	Pin-Tips	Hang-up PL disable and speaker muting feature for MICOR
TLN-4505A	Handset	Pin-Tips	Hang-up cradle only MOTRAC, MOTRAN, MOCOM•70, MICOR
TLN-4507A	Handset	Pin-Tips	Hang-up PL disable and speaker muting feature, MOTRAC, MOTRAN, MOCOM•70
TLN-4687A	Microphone	Pin-Tip	MOTRAC, MOTRAN
TLN-4416A	Microphone	2 Pin Plug	MOCOM•35
TLN-4786A	Microphone	Pin-Tip	MODAR (25W)
TLN-4787A	Handset	Pin-Tip	MODAR
TRN-6319A	Handset	Pin-Tip	MAXAR

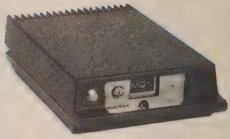
*Requires TKN-6486A Adaptor cable (order separately)

MOCOM Radio Accessories

Low-Band
MOCOM•10


MOCOM•30


High-Band & UHF
MOCOM•10
MOCOM•35


MOCOM•70

Cable Kits

MODEL NO.	DESCRIPTION
TKN-6533A	Base station cable kit Mocom•10 & 35, HB & UHF
TKN-6100A	Mocom•30 dash mtg., 12V
TKN-6329A	Mocom•10 dash mtg., 12V
TKN-6923A	Mocom•70 multi-frequency, 20′, 12V, 60 watts and up. Requires TKN-6458A (cable and fuse).
TKN-6105A	Mocom•30 and Mocom•70 multi-frequency, 20′, 12V, trunk mounting. Up to 50 watts.
TKN-6445A	Mocom•10 HB & UHF, Mocom•35 neg. grd. 12V
TKN-6487A	Mocom•35 pos. grd. 12V

Installation Kits

MODEL NO.	DESCRIPTION
TLN-4693A	Installation kit Mocom•10 HB & UHF
TLN-4446A	Hump mount kit Mocom•10 & 35 HB & UHF
TLN-6042A	Installation kit for trunk mount installations, Mocom•30, Mocom•70
TLN-6380A	Installation kit for dash mount installations, Mocom•30
TLN-8697A	Installation kit for Mocom•10
TLN-4208A	Dash mount installation kit for Mocom•70
TLN-4304A	Dash mount installation kit for Mocom•35

Microphones and Accessories

MODEL NO.	DESCRIPTION
TMN-1002A	Base Station Microphone Mocom•10 & 35, HB & UHF carrier squelch
TMN-1003A	Base Station Microphone Mocom•10 & 35, HB & UHF Private-Line
P-7255A	Noise cancelling microphone with coiled cord and connector for Mocom•70
TMN-6013A	Transistorized microphone with tinsel coiled cord and connector for Mocom•30 and Mocom•70
TMN-6018A	Transistorized weatherproof microphone for Mocom•70
TMN-6049A	Microphone for Mocom•10 wire in terminals
TMN-6055A	Microphone for Mocom•35 with connector
TMN-6006B	Transistorized handset for Mocom•70
TU-526	Handset hang up box for rear mount Mocom•70 has individual pin tip plugs
TMN-6072A	Mocom•35 Handset
TLN-1560A	Mocom•10 and 35 Handset hang up with "PL" disable and speaker muting switch.
TLN-4416A	Hang up box for "Mocom•10" HB & UHF, "Mocom•35" with PL disable switch
TLN-4436A	Microphone hang up box for PL monitoring on 450-470. Mocom•30 dash mtg. only. Requires TKN-6486A Cable Kit.
TLN-6246A	Microphone hang up box for private line monitoring of trunk mount mobiles for Mocom•30 & Mocom•70
TLN-6526A	Microphone hang up box for PL monitoring on 136-174 Mocom•30 dash mtg. only (TKN-6136A cable kit required)
TLN-8695A	Microphone hang up box for Mocom•10
TLN-8701A	Microphone hang up box for PL monitoring on 450-470 Mocom•30 dash mtg. only (TKN-6330A cable kit required)

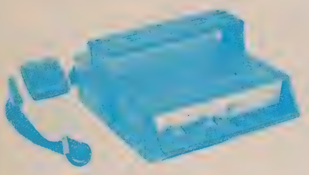
Speakers

MODEL NO.	DESCRIPTION
TSN-6000A	Speaker Mocom•30 and Mocom•70
TSN-6002A	Transistorized power voice speaker for Mocom•70. Operates on 12 volts, 15 watts audio output
TSN-6013A	Trunnion mtg. speaker for Mocom•10

Miscellaneous Accessories

MODEL NO.	DESCRIPTION
TLN-4712A	Base Station Mounting Tray Mocom•35
TLN-4713A	Base Station Mounting Tray Mocom•10, HB & UHF
TPN-1098A	Base Station Power Supply Mocom•35
TPN-1094A	Base Station Power Supply Mocom•10, HB & UHF
TLN-8482A	Positive negative ground kit for Mocom•70. Provides positive/negative ground interchangeability
TLN-8845A	Alternator ignition noise reduction kit for low band Mocom•70 models only
TLN-1097A	Time out timer for Mocom•70 (TLN-4323A mounting kit required)
TLN-4400A	Lock for Mocom•10
TLN-1225A	Automute kit for base and mobile Mocom•10 (Requires Freq.)

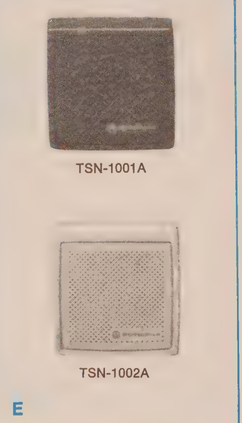
MAXAR/MOXY Radios



TMN-6104A
TMN-6130B
A

TRN-6283A
TRN-6284A
1-16241
1-851093
C
TRN-6319A

TSN-6022B
D
TSN-6025A



Microphones

A High impact, plastic, transistorized mobile dynamic microphones. Self contained transistorized preamplifiers strengthen voice signal and reduce noise. TMN-6130B supplied with hang-up clip and screws.

TMN-6104A	Microphone, MAXAR Radio
TMN-6130B	Microphone, MOXY Radio

Handsets

B Dynamic handset with 5 conductor coil cord terminated in 5 spade lugs.

TMN-6113A	Handset, MAXAR/MOXY Radios

Microphone and Handset Hang-Up Boxes and Clips

C A variety of hang-up boxes and microphone clips are available.

TRN-6283A	Microphone hang-up box. Includes switch for "Private-Line" disable.
TRN-6284A	Microphone hang-up box with "Private-Line" disable and speaker muting feature.
1-16241	Microphone standard hang-up clip
1-851093	Spring loaded microphone clip. Spring tension holds microphone in clip.
TRN-6319A	Handset hang-up box with "Private-Line" disposable and speaker muting feature.

External Speaker

D For MAXAR/MOXY Radios. Speaker impedance is 4 ohms with a power rating of 10 watts. Weight is 1.5 lbs.

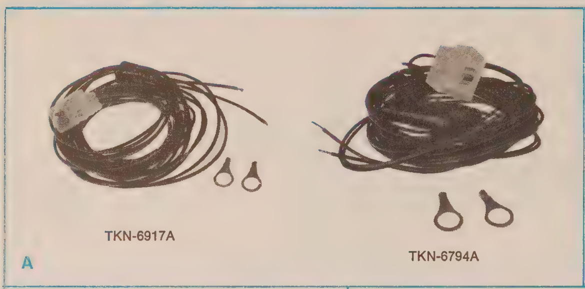
TSN-6022B	MAXAR Radio Speaker, 8′ cord.
TSN-6025A	MOXY Radio Speaker, 8′ cord.

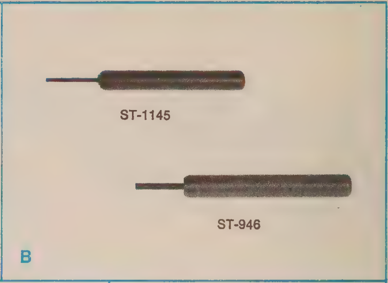
Speaker Amplifier

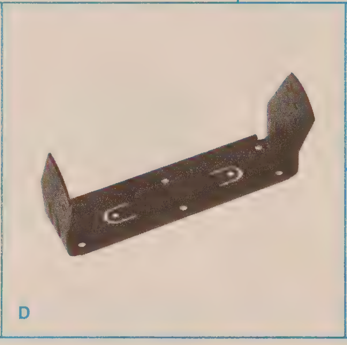
E The speaker/amplifier consists of a six-watt integrated circuit amplifier and a 2.0 Ohm speaker enclosed in a rugged weather-resistant housing.

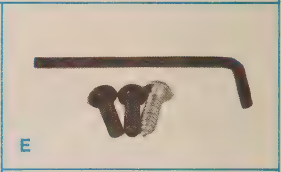
TSN-1001A	MOXY Radio, shadow bronze.
TSN-1002A	MAXAR Radio, shadow white.

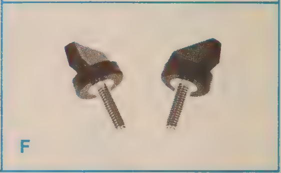
MAXAR/MOXY Radios











Power Cables

A Cable kits consist of connector at one end to fit into radio. Approximately 10 feet of wire which contains an in-line fuse and 2 crimp lugs.

TKN-6917A	30/25w MAXAR high performance radio.
TKN-6794A	For all MAXAR radios except high performance and for all MOXY radios.

Power Plug Wire Replacement

B Two special wire extraction tools are available to remove wires from power plug P106. These tools must be used for ease of wire extraction and to prevent damage to the connector or its pins.

ST-1145	for .062″ diameter pins.
ST-946	for .093″ diameter pins.

Mounting Hardware

C The locking trunnion consists of a two piece trunnion type mounting bracket equipped with a key lock and associated mounting screws and is designed to facilitate ease of removal.

TEN-1001A	Locking trunnion MAXAR/MOXY Radios (replaces TLN-5992A)

D The optional trunnion mount allows the radio set to be mounted to a variety of mounting surfaces.

TRN-6209A	Complete kit including trunnion, 2 machine screws and 6 self-tapping screws MAXAR Radio.
TRN-6905A	Same as TRN-6209A except for MOXY Radio.
7-83131K01	Trunnion only. MAXAR/MOXY Radios.

E Security mounting hardware kit containing special security screws and tool.

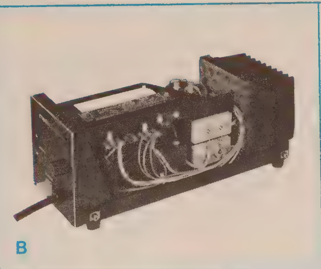
TRN-6524A	Security mouunting kit. MAXAR/MOXY Radios.

F Radio to trunnion quick mounting screws.

3-84351K01	Mounting Screws, MAXAR/MOXY Radios.

MAXAR/MOXY Radios

A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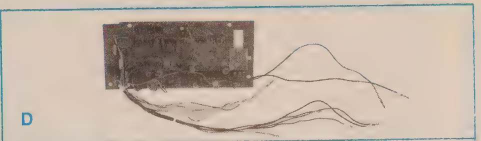
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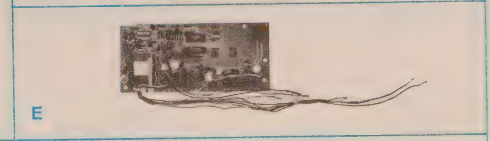
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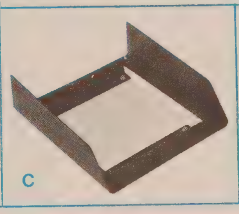
C

F
SKN-6029A
SKN-6030A
RPX-4028A

Desk Microphones

A The desk microphones provide a desk surface, self-supporting stand to mount the PTT and "Private-Line" monitor switches and to support the dynamic cardioid microphone element at mouth level. The TMN-1008A and TMN-1010A are used in "Private-Line" squelch systems and provide both PTT and monitor switches; the TMN-1009A and TMN-1011A are used with Carrier Squelch systems and use only the PTT switch. The TMN-1018A is used in paging applications and includes both PTT and monitor switches. These desk microphones can be used with MAXAR or MOXY radios.

TMN-1008A	Desk Microphone ("Private-Line")
TMN-1009A	Desk Microphone (CS)
TMN-1010A	Desk Microphone with Connector ("Private-Line")
TMN-1011A	Desk Microphone with Connector (CS)
TMN-1018A	Desk Microphone with Lugs ("Private-Line")

AC Power Supplies

B Base Station AC Power Supply provides the entire radio with regulated +14.5v DC when used in a 120v AC primary power fixed installation.

TPN-1136A	For all MAXAR/MOXY radios except high performance.
TPN-1154A	MAXAR 30/25w high performance radios only.
TLN-5279A	Connector kit to be used with TPN-1154A (order separately).

Base Station Mounting Trays

C Converts mobile to base. Consists of metal mounting tray for radio with 4 rubber feet for non-scratch contact. Order power supply separately.

TRN-6223A	Base Station Mounting Tray without microphone clip
TRN-6318A	Base Station Mounting Tray with microphone clip

Field Installation Kits

"Private-Line" Tone-Coded Squelch

D Motorola's dependable PRIVATE-LINE tone-coded squelch option lets the radio accept only those signals with the correct tone coding. This eliminates having to listen to all messages on the same frequency, reduces operator fatigue, and allows more efficient use of air time.

TRN-6177B	"Private-Line" Tone Coded Squelch kit

"Digital Private-Line" Coded Squelch

E "Digital Private-Line" squelch is a totally new coded squelch system. It is completely solid state, using large scale integrated circuitry. Coded squelch eliminates annoying co-channel message reception. Your operators will only hear those calls that have your individual system code. When a message is finished, your receivers will be muted until another unit in your system originates a message. Operator fatigue is thereby reduced and missed or misunderstood messages are minimized. The 80 new, unique system codes provided by "Digital Private-Line" squelch insure the effectiveness of your communications system for years to come.

TRN-6207A	"Digital Private-Line" Coded Squelch kit

Test Cables

F The MAXAR Radio incorporates a metering socket for testing with the Motorola S-1056 series test set.

(MAXAR Radio Only)

SKN-6029A	Metering adapter cable for use with TEK-5 Metering Panel.
SKN-6030A	Metering adapter cable for use with model S-1056 portable mobile test set.
RPX-4028A	Adapter cable to be used with SKN-6029A and SKN-6030A on 30/25W MAXAR High Performance Radios only.

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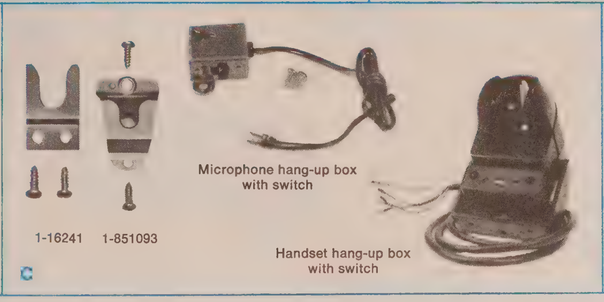
MITREK Radio

Standard palm-type microphone

Noise cancelling microphone



Microphone hang-up box with switch

Handset hang-up box with switch

Microphones

A The entire microphone assembly — dynamic element plus transistorized pre-amplifier — is housed in a durable, shock-proof, plastic housing. Its shape is "human engineered" for easy one-hand operation, and it is available in a weather-resistant model for efficient communications under adverse conditions. Noise cancelling model is available for use in high noise level areas.

All-transistor pre-amplifier, built into the microphone housing, reduces hum and stray noise pickup for added clarity and increased communications efficiency.

HMN-4000A	Weather resistant microphone
HMN-4001A	Non-weather proof microphone
TMN-6116A	Noise Cancelling Microphone

Handset

B This unit is available for those who prefer the convenience of a telephone-type handset. The push-to-talk button is conveniently located in the handset to permit the freedom of one-hand operation. The dynamic element and transistorized pre-amplifier strengthen the voice signal for improved clarity. The magnetic element in the speaker earpiece provides the operator with a crisp telephone-type audio output.

TMN-6057A	Handset

Microphone and Handset Hang-Up Boxes and Clips

C Hang-up switch kits are available which will automatically disable the "Private-Line" squelch function of the receiver while the microphone or handset is off-hook. This option enables the operator to check for a clear channel before transmitting (as required by law).

1-16241	Microphone standard hang-up clip.
1-851093	Spring loaded microphone clip. Spring tension holds microphone in clip.
HLN-4024A	Microphone hang-up box with automatic monitor for "Private-Line" squelch.
HLN-4025A	Microphone hang-up box with automatic monitor and "Private-Line" squelch disable switch.
TLN-4505A	Carrier squelch handset hang-up box.
TLN-4698A	Handset hang-up box with automatic monitor for "Private-Line" squelch.
TLN-4507A	Handset hang-up box with automatic monitor and "Private-Line" squelch disable switch.

External Weather Resistant Speaker

D The HSN-4000A Weather resistant speaker is designed for use with the "MITREK" series radio and is supplied with a universal mount for installation in many applications.

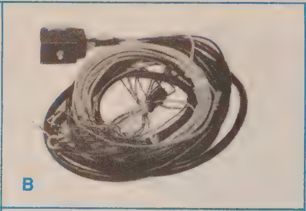
A hang-up clip on the rear of the speaker allows temporary hanging of the unit on the vehicle door window, to permit monitoring radio messages while the driver is outside the vehicle. Quick removal is permitted by the special slotted mounting bracket.

Speaker impedance is 3.2 ohms, dimensions are 127 mm x 127 mm x 63 mm (5″ w x 5″ l x 2.5″ h) excluding mounting bracket and weight is 680 g (1.5 lbs).

HSN-4000A	Weather resistant Speaker

MITREK Radios

A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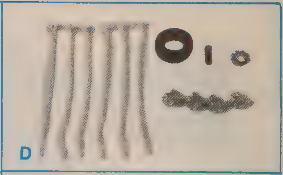
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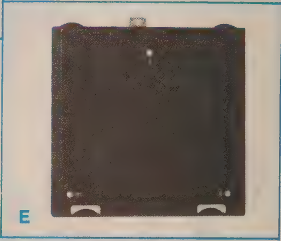
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Control Heads

A The contemporary control head blends well with any vehicle's interior. The control head's high impact molded exterior and durable construction is built to take the toughest abuse.

Operator and passenger safety is enhanced by the use of recessed control knobs and the elimination of sharp projections on the control head.

Operator convenience is also assured by the use of marked control knobs that can be set to desired levels without further adjustment.

Non-glare indicators are softly illuminated through a unique light-piping device that allows light to be directed to each control function for easy identification under dark or semi-dark conditions.

HCN-4000A	1 freq carrier squelch weather resistant
HCN-4001A	4 freq carrier squelch weather resistant
HCN-4002A	1 freq "PRIVATE-LINE" squelch weather resistant
HCN-4003A	4 freq "PRIVATE-LINE" squelch weather resistant
HCN-4004A	1 freq "PRIVATE-LINE" squelch busy light, non-weather proof
HCN-4005A	4 freq "PRIVATE-LINE" squelch busy light, non-weather proof
HCN-4006A	1 freq "PRIVATE-LINE" squelch busy light, weather resistant
HCN-4007A	4 freq "PRIVATE-LINE" squelch busy light, weather resistant
HCN-4008A	1 freq carrier squelch non-weather proof
HCN-4009A	4 freq carrier squelch non-weather proof
HCN-4010A	1 freq "PRIVATE-LINE" squelch non-weather proof
HCN-4011A	4 freq "PRIVATE-LINE" squelch non-weather proof

Power Cable Kits

B For new installations or replacement. Use new cable kits for easy transfer of radio from one vehicle to another.

HKN-4000A	17 foot, neg ground, T1-R1 models.
HKN-4001A	17 foot, neg ground, T4-R4 models.
HKN-4002A	22 foot, neg ground, all models.
HKN-4004A	10 foot, neg ground, all models.
HKN-4006A	17 foot, pos ground, both T1-R1 and T4-R4 models.
HKN-4003A	22 foot, pos ground, both T1-R1 and T4-R4 models.
HKN-4005A	10 foot, pos ground, both T1-R1 and T4-R4 models.

Transmit/Ignition Switch Cable Kit

C This optional cable kit is available to allow the receiver to be connected directly to the vehicle battery for continuous operation while connecting the transmitter to the ignition switch.

HKN-4007A	Transmit/Ignition switch cable kit

Installation Kit

D This convenient installation kit contains 4, ¼-14x½ tapping screws (3-139965), a ¼" internal locking washer (4-7688), a closed end crimp terminal (29-812980), a rubber grommet (37-103890), and 6, 5.5" nylon tie straps for use in installing a radio in a vehicle.

HLN-4022A	Installation kit

Bottom Mounting Plate

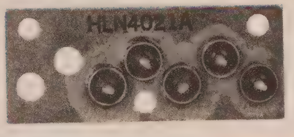
E Mounting plate mounts to suitable surface in vehicle (trunk or under seat) with 3 screws and radio locks in plate with locking handle.

HLN-4034A	Bottom Mounting Plate

MITREK Radio

A

Photo for reference only 16 vials supplied



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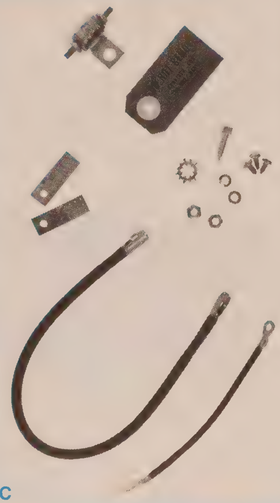

C

Metric Hardware kit for "MITREK" Radios

A This kit contains an assortment of metric screws and nuts used in the "MITREK" Radio. The contents of the kit are listed below. Kit supplied with ST-174 hardware rack and 16 vials.

RPX-4062A	Metric Hardware Starter Kit

Contents of RPX-4062A

03-10903A93	screw, machine M3.5x0.6x13 poz pan stl. 75 supplied
03-10903A97	screw, machine M3.5x0.6x30 poz pan stl. 25 supplied
03-10904A02	screw, machine M3.5x0.6x6 poz pan stl. 125 supplied
03-10904A15	screw, machine M3.5x0.6x13 poz pan stl. 125 supplied
03-10904A45	screw, machine M3.5x0.6x13 poz pan serr. 70 supplied
03-10905A01	screw, machine M3.0x0.6 poz stl znc. 200 supplied
03-10906A05	screw, machine M3.5x0.6x6 poz flt stl. 200 supplied
03-10906A19	screw, machine M3.5x0.6x13 poz flt stl. 90 supplied
03-10906A72	screw, machine M3.5x0.6x13 poz flt stl. 75 supplied
03-10936A06	screw, tapping B3.5x1.27x8 pln hex serr. 125 supplied
03-10936B06	screw, tapping B3.5x1.27x8 poz flt chs. 150 supplied
03-10936C06	screw, tapping B3.5x1.27x8 poz fil chs. 150 supplied
03-10936B15	screw, tapping B3.5x1.27x13 poz flt chs. 90 supplied
02-80045A01	nut, retainer M5x.8. 150 supplied
02-80045A02	nut, retainer M8x1.25. 50 supplied
02-80045A03	nut, retainer M6x1.0. 100 supplied

Time out Timer

B Inadvertent prolonged keying of a transmitter can "lock up" a repeater or tie up a channel for everyone on it. Motorola's Time-Out Timer option emits an alert tone and shuts off the transmitter after the transmission exceeds 60 seconds. The transmitter instantly resets after being shut down.

HLN-4021A	Timeout Timer

Ignition Noise Reduction Kit (Low Band Only)

C This kit is designed for use in vehicles equipped with two-way radios and alternator electrical systems. Noise reduction is accomplished by proper bonding, filtering with coaxial capacitors, and other techniques outlined in the instructions for this kit.

Kit includes: lead and lug assembly (1-839913), coaxial capacitor 0.1 MFD at 1000V (8-82571B02), ignition coil suppressor cable (30-502396) and hood wipers and mounting hardware kit (1-80782A52).

TLN-8845A	Ignition noise reduction kit (low band only).

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MICOR SYSTEMS 90
Electronic Siren and Public Address System

Siren includes top circuit card and amplifier. Order housing and other options separately.

Micor Systems 90 Electronic Siren and Public Address System

Another dimension of versatility is now available to MICOR radio users with the MICOR SYSTEMS 90 Electronic Siren. This accessory provides siren capability to all MICOR radio users while at the same time helping to alleviate space problems in the driver's compartment. The option consists of a MICOR SYSTEMS 90 control module and a separate amplifier. It is fully compatible with all MICOR radios and with other MICOR SYSTEMS 90 options. Also, it can be used with either positive ground or negative ground installations, and thus can be installed in any vehicle in the fleet.

The photograph above shows a MICOR SYSTEMS 90 control group with the electronic siren. The MICOR SYSTEMS 90 housing and other options are available at additional cost.

FEATURES

MICOR SYSTEMS 90 Compatability — The siren control module is a MICOR SYSTEMS 90 circuit card and is fully compatible with other MICOR SYSTEMS 90 options.

Versatile Operation — The Electronic Siren provides simple push-button selection of the following sounds: Steady Tone Model: wail and warble; Hi-Lo Model: wail, warble, and hi-lo. External operation of the radio is also included, as well as a public address function.

Public Address System—Public address can be made over the same speaker as the siren, using the microphone included in the standard MICOR radio package.

Separate Volume Control — The public address volume control is separate from the on-off switch, thus allowing the operator to set the volume and leave it without adjustment each time the public address is used.

Separate Control Module and Amplifier—The siren control module and the amplifier are separate units, allowing the amplifier to be mounted in a location remote from the control module. This results in a considerable space savings in the driver's compartment since the entire amplifier does not have to be mounted in an operator-accessible location.

Illuminated Graphics—The siren control module graphics are illuminated for positive identification under any lighting condition.

High Output—Cuts right through crowd and trafffic noises. The system gives 70 watts of siren output power and 35 watts of public address output power.

Instant-"on" and Instant-"off" — Transistorized circuitry means no warm-up time; the siren and public address are ready to go instantly. When the siren is turned off, it silences immediately with no trailing sound.

High Reliability—The MICOR SYSTEMS 90 Electronic Siren is a heavy duty, conservatively rated unit. This translates into long life and high reliability for the user.

TLN-1704A	Steady Tone Model
TLN-1705A	Hi-Lo Tone Model

Order housing separately.

SPECIFICATIONS

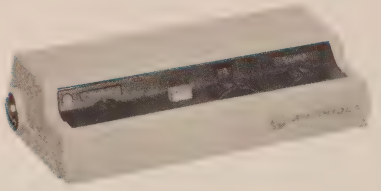
GENERAL: Operation: 12V dc, positive or negative ground. **Operating Temperature:** −30°C to +60°C. **Standby Current Drain:** 0.3A @ 13.6V.

AMPLIFIER: Duty Cycle: Continuous. **Dimensions:** 3″ H x 7¼″ L x 6½″ D (76 mm x 184 mm x 165 mm). **Weight:** Approx. 7 lbs. (3175g).

SIREN: Minimum Power Output: 100W rms @ 16.5V into 11 ohm speaker. **Operating Current Drain:** 11A at 100W.

PUBLIC ADDRESS: Minimum Power Output: 50W rms @ 16.3V into 11 ohm speaker. **Operating Current Drain:** 7.0A at 50W. **Frequency Response:** ±3 dB from 300 to 3,000 Hz. **Distortion:** Less than 10% from 1 watt to rated power output.

MICOR Systems 90 Radio Accessory Group



Standard control head, less trunnion mount for use with THN-6123A Housing and long trunnion mounting unit.

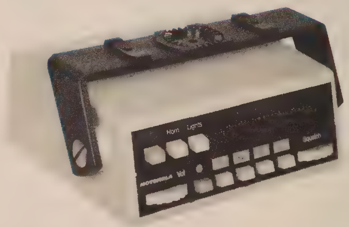
B

THN-6124A Housing Kit shown with two accessory options and control module.

A

THN-6123A Housing Kit shown with one accessory option and standard control head.

C



THN-6125A Housing Kit shown with single accessory option and control module.

The most flexible and comprehensive system of mobile options available • More than 2600 *standard* configurations • The 12 most-used accessories • Two alternate control module options • One, two, three or more options with the same MICOR radio • Custom selection and arrangement • MICOR radio reliability with integrated circuits • Total illumination for safe visibility day or night.

Convenience and Safety

The MICOR Systems 90 radio accessory group provides a centralized control panel with pushbutton function switches for fingertip control. Controls and indicators are illuminated for quick, day-or-night visibility. Uses MICOR safety-designed breakaway mounting.

Custom Selection

Choose one or more of the 12 most-used system accessory options to fit the needs of your communications system. You select the position of each accessory option for maximum operator convenience.

Simplified Installation, Maintenance

Modular construction, plug-in circuit board assembly, simple-to-remove trunnion mount contribute to simple installation and ready access for maintenance.

Micor Systems 90 Housing Kits

A Consists of 1 housing with a long trunnion for up to 2 options, for use with the TCN-1095 (1-freq.) or TCN-1096 (multi-freq.) control units. Note: The standard MICOR control head (models TCN-1091B and TCN-1092B) can also be mounted with this unit by removing the standard short trunnion.

THN-6123A Housing Kit

B Consists of 2 housings with a long trunnion and will accept up to 3 option modules plus a control module TCN-1097A or TCN-1098A.

THN-6124A Housing Kit

C Consists of 1 housing with short trunnion and will accept 1 option module and control module TCN-1097 or TCN-1098.

THN-6125A Housing Kit

Micor Control Head Units and Modules

TCN-1095A Control Head (1-freq.) standard single-frequency control head, less trunnion mount for use with THN-6123A Housing and long trunnion mount unit.

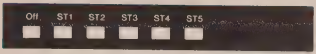
TCN-1096A Control Head (4-freq.) same as TCN-1095A above except 4-frequency.

TCN-1112A Control Head (8-freq.) less trunnion mount for use with THN-6123A Housing. **Wide space RCVR models only.**

TCN-1119A Control Head (12-freq.) with trunnion mount for use with THN-6123A housing or self-mounting. **UHF models only.**

TCN-1097A Control Module (1-freq.) single-frequency control module for mounting in THN-6124A or THN-6125A housing.

TCN-1098A Control Module (4-freq.) same as TCN-1097A above except 4-frequency.



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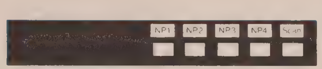


B

PA
Ext
Int
PA Volume

C

D

Mobile Singletone Encoder

A Motorola "Singletone" provides a fast acting reliable system for repeater access or for remote control and signaling facilities in public safety, civil defense, and commercial applications, such as turning on and off pumps, generators, lighting systems etc. Receiving stations can be selected and then altered by turning on warning lights, sirens, bells or any other visual or audible alarm. The mobile Singletone Encoder transmits a tone pulse to actuate a relay at the receiving unit.

The one-tone model will start a single remote control operation; the 5-tone model allows selection of up to 5 different remote operations.

***TLN-1393A**	One-Tone Encoder
***TLN-1394A**	Five-Tone Encoder

*Frequency required

SPECIFICATIONS

Code Range: 1050 Hz to 3000 Hz in 150 Hz steps

Standard Tone Frequencies (Hz)

1050	1350	1650	1950	2250	2550	2850	2000
1200	1500	1800	2100	2400	2700	3000	2200

Stability: ±1.0% from —30°C to +60°C (—22F° to +140°F) ambient from 10V to 16.5V dc. **Output (into 390 ohm load):** Variable from 50 mv to 225 mv rms max at 1050 Hz, 175 mv max at 3,000 Hz. **Modulation:** Deviation of transmitter-encoder combination will provide 3.3 KHz. **Voltage:** 13.6V dc ±20% neg or pos ground. **Tone Duration:** Factory set for 0.5 seconds — internal jumper permits 1.5 second — external jumper provides continuous operation for test. **Output Impedance:** 1,000 to 20,000 ohms depending on setting of output level control. **Maximum Current Drain:** 215 ma. **Maximum Frequency Separation:** Ratio of highest tone to lowest tone cannot exceed 1.7 to 1.

Mobile Public Address

B This system accessory option adds the versatility of both a public address and an external radio output to the full 10 watt audio capability of the MICOR mobile radio.

The *"PA" mode* makes use of the MICOR microphone and audio circuit for a Public Address system; can be used with a separately obtained weatherproof speaker, as in public safety applications, or under-roof speaker, as in school bus or similar applications. Automatic reverting to internal receive is provided whenever the microphone is not keyed. The radio *"External" mode* applies incoming radio calls to the public address speaker, and is useful whenever the operator must hear the messages when out of the vehicle. In this mode a portable radio and the mobile can be used as a remote control public address system with many operational possibilities. The radio *"Internal" mode* places the mobile radio in normal operation. In both the "PA" mode and the "External" mode, the public address speaker volume is regulated by its own separate control. The radio's internal volume control setting can be left undisturbed.

TLN-1392A	Public Address Module

SPECIFICATIONS

Operating Voltage: 13.8V dc ±20% neg or pos ground. **Power Output:** 10 Watts into 8 ohms @ 13.8V dc. **Distortion:** Less than 5% at Rated Output. **Maximum Circuit Board Current Drain:** 230 ma. **Radio Current Drain at 10 Watts P.A.:** 3.0 amp Max. **Temperature:** —30°C to +60°C (—22°F to +140°F). **Input Impedance, Microphone:** 1,500 Ohms minimum in "PA" mode **Discriminator:** 50,00 Ohms minimum.
Public Address speaker not included, must be obtained separately.

CHANNEL SCAN Monitor for 2, 3, or 4 Frequency MICOR Radios

C Monitor up to three alternate channels without missing a call on the priority channel. The first signal received will be heard on the speaker. If this is a "non-priority" channel, the monitor will continue to sample the priority channel. A priority message automatically reverts the radio to the priority channel and stops the scanning action.

In the *Selectable Non-Priority* "Channel Scan" monitor (pictured), the priority channel is predetermined and the operator can select one, two or three alternate channels for scanning. For *Selectable Priority* "Channel Scan," the operator selects one channel for priority, all others are scanned as non-priority.

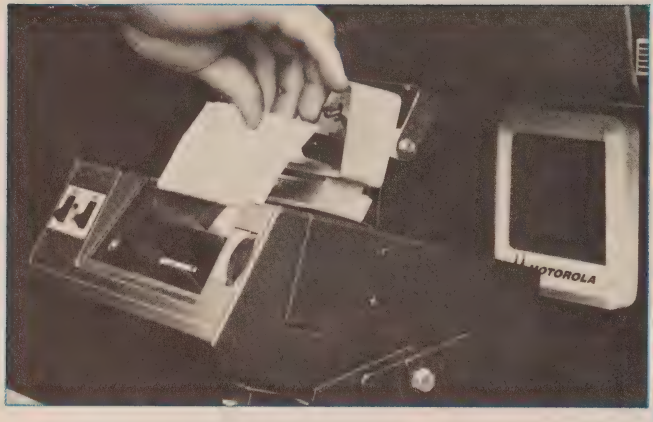
TLN-1387A	Priority select, 4 of 4 freq. "P-L" on carrier squelch.
TLN-1388A	Non-priority select, 4 of 4 freq. "P-L" on carrier squelch

SPECIFICATIONS

Sensitivity: Improved to less than 6 dB quieting at threshold squelch. **Input Impedance:** 18,000 ohms. **Temperature Range:** —30°C to +60°C (—22°F to +140°F). **Scan Rate:** 6 msec. **Maximum Current Drain at 13.8V dc:** Scan off, 180 ma, Scan on, 350 ma. **Operation:** 13.8V dc ±20% NEGATIVE GROUND ONLY.

(MICOR Systems 90 Accessories continued on next page.)

MODAT Supplies



Mobile Printer Supplies

A Two types of paper are available for your MODAT D-1000 Mobile printer, D-1002 Station printer, and D-1005 Monitor printer. Ink encapsulated paper provides purple printing and is useful over a limited temperature range. Wax coated paper provides black printing and is recommended for all weather use. Both types are supplied in cartons of 25 rolls.

DDN-6000A	Ink encapsulated paper
DDN-6001A	Wax coated paper

Miscellaneous Micor Accessories

A wide variety of accessories adds greater utility and flexibiilty to your MICOR Radio.

1-80719B58	Bottom plate
15-84912C01	Weatherproof Housing (see TLN-4570A)
59-813674	30 Amp—12 VDC relay for TLN-1397A Auxiliary Switch Panel
TKN-6470B	Positive Ground Cable Kit for Converter TLN-4390B
TLN-1361A	Time-Out Timer
TLN-4347A	Installation Kit
TLN-4390B	Positive Ground Converter (see TKN-6470B)
TLN-4570A	Mounting Hardware Kit for Weatherproof Housing 15-84912C01
TLN-5277A	VHF MICOR Radio battery line filter, — ground
TLN-5278A	Same as TLN-5277A except + ground
TLN-6252A	Low or High Band Generator or Alternator Ignition Noise Reduction Kit
TLN-8845A	Low Band Alternator Ignition Noise Reduction Kit

MICOR Systems 90 Radio Accessory Group

Mobile Auxiliary Switch Panel

This pushbutton-operated control panel can be used in hundreds of different applications. Five Form "C" switches and corresponding dual level indicator lights are provided.

The three center switches are push-on/push-off type; the end switches are momentary. All five switches are rated for 1 amp at 28V dc or 0.45 amp at 120V ac. External relays, obtained separately, can be used where heavier currents are expected. Each Form "C" switch is provided with 12 ft. of wire to facilitate installation. Also, A+ wires are fused for safety.

The Wild Card can be used to control any of the electrical functions in the vehicle, or functions that can be wired externally. Some suggested uses are: winch operation control of electric motors, vehicle lights, portable lights, electrically operated hydraulic systems, ignition control of engines, remote operation of electric breakers or multiple contact relays, speed control, acoustic signal control, burglar alarm and many others.

A set of over 90 pushbutton labels is furnished with each module allowing you to custom design the installation. Set includes letters of the alphabet, numerals, and many standard terms.

TLN-1397A	Universal Wild Card Module
TLN-1389A	Quik call decoder module 4 reed, individual or group call, horn and lights.
TLN-1390A	Quik call II decoder module group call, horn and lights.
TLN-1391A	Quik call II decoder module, 2 reed individual call, horn and lights.

Mobile Multiple "Private-Line" and "Digital Private-Line" Encoders

These Multiple encoders equip Motorola "Micor" FM radios for operation in several different "Private-Line" and "Digital Private-Line" networks. Models are available for a maximum of four or eight codes. Each encoder is constructed on a single printed circuit board that mounts in a Motorola "Systems 90" accessory housing. The multiple encoder must be used with the appropriate encoder board in the radio set.

Encoders to be used with early "Micor" radios that do not have DPL Exciter boards. Supplied less reeds.

TLN-1395A	Four tone "Private-Line" encoder VHF
TLN-1396A	Eight tone "Private-Line" encoder VHF
TLN-1547A	Four tone "Private-Line" encoder UHF
TLN-1548A	Eight tone "Private-Line" encoder UHF

Encoders to be used with later version "Micor" radios having DPL Exciter Board. Supplied less reeds.

TLN-1837A	Four tone "Private-Line" encoder VHF
TLN-1838A	Eight tone "Private-Line" encoder VHF
TLN-1839A	Four tone "Private-Line" encoder UHF
TLN-1840A	Eight tone "Private-Line" encoder UHF

Supplied less reeds or code plugs.

Low Band (30-50 MHz) radios:

TLN-1707A	Four code
TLN-1708A	Eight code

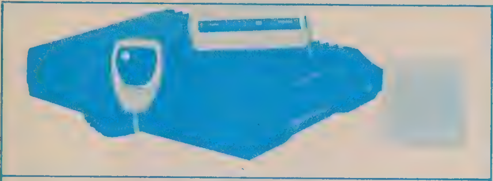
VHF (150-174 MHz) radios:

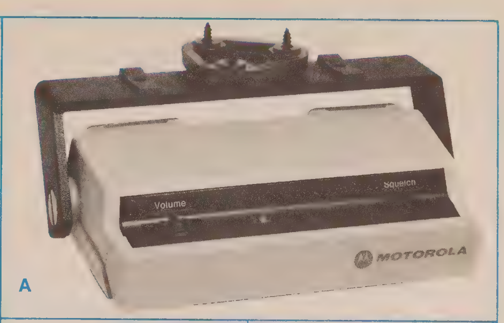
TLN-1711A	Four Code
TLN-1712A	Eight Code

UHF radios:

TLN-1709A	Four code
TLN-1710A	Eight code

MICOR Radio Accessories





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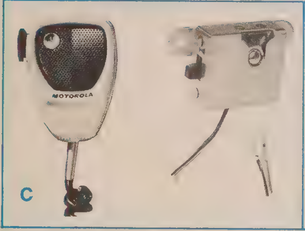

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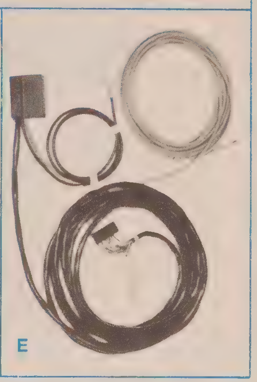

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Standard Control Heads

A These control heads can be used for standard and PL squelch and EXTENDER applications. (NOTE: EXTENDER switch is located on rear of unit.)

When these control heads are used in PRIVATE-LINE applications, order TLN-4346A or TLN-5181A hang-up box.

TCN-1091B	One frequency
TCN-1092B	Multi-frequency, up to four frequency
TCN-1106A	Control head (8 Freq.) wide space RCVR models only
TCN-1119A	Control head (12 Freq.) UHF Micor only
TLN-5181A	Hang-up box for PRIVATE-LINE radio.

MICOR Speaker

B The TSN-6016B speaker is designed for use with the "Micor" series radio and is supplied with a universal mount for installation in many applications.

A hang-up clip on the rear of the speaker allows temporary hanging of the unit on the vehicle door window, to permit monitoring radio messages while the driver is outside the vehicle. Quick removal is permitted by the special slotted mounting bracket.

Speaker impedance is eight ohms with a power rating of ten watts.

TSN-6016B	Speaker, 8′ cord
TSN-6020A	Speaker, 25′ cord, for use with TLN-1392A PA module
TSN-6019B	Same as TSN-6016B except used with Motrac Control head

MICOR Microphone

C Dynamic element with integral pre-amplifier provides superior voice quality. Equipped with 12 inch tinsel coiled cord and 5-prong molded connector. Hang-up switch box for use with PRIVATE-LINE dual squelch provides automatic switching to carrier squelch when microphone is picked up and includes switch to disable "PL" without coming "off-hook."

TMN-6054A	MICOR mobile microphone
TLN-5181A	Microphone hang-up box for "PL" monitoring of trunk mount mobiles.

Micor Handset

D Handset with dynamic cartridge for use with MICOR Radio equipped with 5-prong molded connector.

TMN-6057A	Handset
TLN-4504A	Handset hang-up, "PL" disable and speaker mounting
TLN-4505A	Hang-up cradle only

MICOR Cable Kits

E For new installations or replacement. Use new cable kits for easy transfer of radio from one vehicle to another.

TKN-6455B	Radio Cable—Multi-frequency—22 ft.
TKN-6456A	Control Head Power Cable
TKN-6457A	Cable & Fuse (Low Power)
TKN-6458A	Cable & Fuse (High Power)
TKN-6470B	Radio Cable—Positive Ground Multi-frequency—22 ft.
TKN-6483B	Radio Cable—MICOR with MOTRAC Accessories—Negative Ground Multi-frequency—22 ft.
TKN-6484B	Radio Cable—MICOR with MOTRAC Accessories—Positive Ground Multi-frequency—22 ft.
TKN-6548A	Radio Cable—8 freq.—18 ft. (Wide Spaced Rcvr Models Only)
TKN-6607A	Radio Cable—22 ft.—12 freq. (UHF MICOR Only)

Micor Receiver Pre-amplifiers

Use in low noise, fringe areas for improved reception of weak signals.

TLD-8421B	132-150.8 MHz Pre-amplifier
TLD-8422B	150.8-174 MHz Pre-amplifier
TLE-8192A	450-512 MHz Pre-amplifier

Speakers

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Base Station Auxiliary Speakers

A The Auxiliary Speaker Kit provides an additional speaker for use with a base station or the remote control console associated with the base station. The speaker housing includes rubber feet for convenient placement on a desk top or other working surface.

A choice of one of the three models provide flexibility of application. A 3-ohm unit with or without volume control is available for parallel connection with the existing remote control speaker or a 500-ohm input unit is available for connection across the high impedance audio line. Speakers supplied less cable. All speaker kits have terminal board termination.

TSN-6005A	Speaker, 3 ohm less volume control
TSN-6006A	Speaker, 3 ohm with volume control
TSN-6007A	Speaker, 3 ohm with 500 ohm impedance transformer and volume control

Transistorized "Power-Voice" Weatherproof Speaker

B This compact, weatherproof speaker-amplifier combination provides up to 15 watts output with either a 1 watt or 5 watt input . . . 15 times as much power as the conventional passive speaker! Flexible trunnion mounting allows the unit to be mounted on any flat surface. It is similar to the TU-433 series and the TSN-6002A series except for the weatherproof housing and chrome-plated trunnion mounting bracket.

The unit is made up of a transformer-coupled, push-pull transistorized amplifier and a 5" PM speaker. As supplied the unit is wired to accept a 1 watt input. For 5 watts input, such as from Motrac, Motran, or Mocom radios, simply move the input lead to the alternate tap on the transformer.

The TSN-6015A is designed to operate in a 13.6 vdc mobile installation. Input impedance is 3.2 ohms. Frequency response is flat within ±1 dB from 300 to 3000 Hz. Distortion is less than 10% at full rated output.

TSN-6015A	Speaker

External Speakers

Supplied with a universal mount for installation in many applications. A hang-up clip on the rear of the speaker allows temporary hanging of the unit on the vehicle door window, to permit monitoring radio messages while the driver is outside the vehicle. Quick removal is permitted by the special slotted mounting bracket.

C For MICOR series radios. Speaker impedance is eight ohms with a power rating of ten watts.

TSN-6016B	Speaker, 8′ cord
TSN-6020A	Speaker, 25′ cord

For use with MOTRAC radio control head.

TSN-6019B	Speaker, 8′ cord

D For MAXAR radios. Speaker impedance is four ohms with a power rating of ten watts. Weight is 1.5 lbs.

TSN-6022A	Speaker, 8′ cord

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B

Transistorized "Power Voice" Mobile Speaker

A A compact speaker-amplifier combination that delivers 10 times as much power as the conventional passive speaker. The "Power Voice" speaker has a built-in transistorized amplifier utilizing two audio power transistors in a Class B push-pull circuit. Approximately 1 watt input to the amplifier provides 15 watts output in 12-volt vehicles and 5 watts output in 6-volt vehicles. Speaker output is varied by adjusting the usual receiver volume control to control the input to the transistor amplifier. Battery drain is less than .3 amp on standby—only 1.0 amp at rated output on speech peaks.

Speaker element has a bandpass frequency response tailored specifically for mobile service, accenting voice frequencies but suppressing ignition noise and other interference outside the basic voice frequency range. The amplifier has a flat response within ±1 dB from 300 to 3000 cps. At full rated output, distortion is less than 10%.

Speaker can be installed on firewall, under the dash or (with optional mounting kit TK-395) on steering column. Quick-detach mounting bracket and 5-ft. coiled cord (4-conductor) facilitate mounting outside vehicle window for monitoring of received messages from a considerable distance away.

TU-433A6V	"Power Voice" Speaker (for 6-volt operation; 5 watts output)
TU-433A12V	"Power Voice" Speaker (for 12-volt operation; 15 watts output)
TSN-6002A	"Power Voice" speaker for "MOTRAC" radio (for 12-volt operation only; 15 watt output)
TK-395	Steering Column Adapter Kit

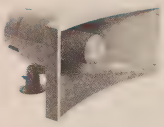
Mobile 5″ Speaker

B Standard bandpass speaker has frequency response tailored for optimum mobile communications—accents voice frequencies and suppresses ignition noise. Trunnion mounting provides mounting flexibility, so that speaker can be mounted on any flat surface within the vehicle.

Speaker assembly consists of 3 ohm 5″ PM speaker assembled in a louvered steel housing with a removable front bezel and grill.

TSN-6000A	"MOTRAC" radio mobile 5″ speaker with pin tips
TSN-6013A	"Mocom•10" radio mobile 5″ speaker with phono plug
TK-395	Steering Column Adapter Kit

University Speakers



University Model CIB-A
7⅜″ x 12″, Dispersion
120° Horiz. 60° Vert.
Motorola No. PDK-5013

University Model IBA
10″ Dia. Dispersion 90°
Motorola No. PDK-501 or 2

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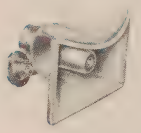
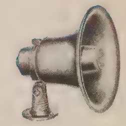


University Model CMIL-A
6¼″ x 8½″ Dispersion
120° Horiz. 60° Vert.
Motorola No. PDK-5010 or 11



University Model MIL-A
7¹³⁄₁₆″ Dia. Dispersion 120°
Motorola No. PDK-503 or 4

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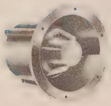

University Model MIS-4 Flush Mount
5½″ dia., 4⁷⁄₁₆″ depth. Dispersion 150°
Motorola No. PDK-5016

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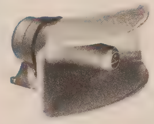
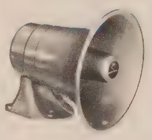


TSN-6009A



TSN-6011A

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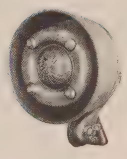

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Paging and Talk-Back Speaker Models for Inside and Outside Applications

Not recommended for vehicular applications.

Top-performing University speakers provide maximum sound intelligibility even in high noise areas. Models are available for paging and talk-back applications, in 4 or 8 ohm units. These can easily be integrated with existing or new intercom systems. Where heavy talk-back operation is required, a 4-ohm unit is recommended. Universal mounting brackets included for all models.

University Models CIBA & IBA

A Excellent-performing medium power speakers . . . 25 watts continuous-duty power capacity . . . frequency response of 250-13,000 Hz.

SPEAKER MODEL	IMPED., OHMS	SHIPPING WEIGHT
PDK-501	4	4 lbs.
PDK-502	8	4 lbs.
PDK-5013	8	5½ lbs.

University Models CMIL-A & MIL-A

B For areas with low noise levels . . . power capacity of 7.5 watts on continuous duty with frequency response of 350-13,000 Hz.

SPEAKER MODEL	IMPED., OHMS	SHIPPING WEIGHT
PDK-503	4	3¼ lbs.
PDK-504	8	3½ lbs.
PDK-5010	4	4 lbs.
PDK-5011	8	4 lbs.

University Model MIS-4

C Flush mounting unit for low noise level areas . . . power capacity of 7.5 watts with frequency response of 500-13,000 Hz.

SPEAKER MODEL	IMPED., OHMS	SHIPPING WEIGHT
PDK-5016	4	2½ lbs.

PA Speakers

D Fully weatherproof. Rated at 75 watts output.

TSN-6011A	Cast aluminum housing. Color: gray. Shipping weight 7 lbs.
TSN-6009A	Wide-arc fiberglass horn. Shipping weight 8 lbs.

University Model MM-2

E Model PDK-505 is similar to TSN-6001A but does not include transformer. Frequency response of 350-10,000 . . . power rating 25 watts at continuous duty . . . 6″ dia. . . . 16 ohm impedance. Ideal for use under severe operating conditions such as steam, dust, chemicals, shock or excessive dampness.

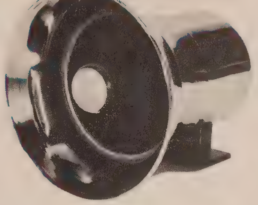
PDK-505	Speaker

Marine Speaker

F The Model TSN-6001A Marine Speaker is specially designed for rugged outdoor installations, such as, railroad operations, etc. A 6″ weatherproof type speaker with a special transformer to match the 16 ohm voice coil to the 500 ohm input line. 100 ohm variable resistor provides a means of adjusting the speaker.

TSN-6001A	Marine Speaker

Atlas Siren Loudspeakers



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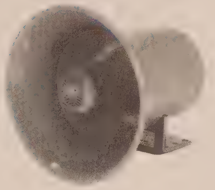

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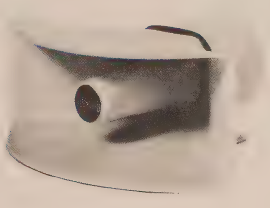

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Round Siren Loudspeaker

Round silhouette, directional (100 degrees dispersion) electronic siren and mobile public address loudspeaker. All metal construction with enclosed bell housing for full weather protection of compression driver. 8¼″ diam., 9 11/16″ long. Shipping wgt. 11½ lbs.

A With chrome plated housing.
TDN-6251A Chrome Siren Loudspeaker

B With gray baked epoxy finish.
TDN-6254A Gray Siren Loudspeaker

Wide-Angle Siren Loudspeaker

C Fiberglass cobra-flared electronic siren and mobile public address loudspeaker. Wide horizontal sound dispersion (120° x 60°) and low wind resistance silhouette. Completely finished in white, baked epoxy. 6″ High, 14⅜″ Wide, 12⅝″ Long. Shipping Weight 12½ lbs.

TDN-6252A Wide-Angle Siren Loudspeaker

Underhood Siren Loudspeaker

D Compact rectangular metal horn type electronic siren loudspeaker. Mostly used for unmarked vehicles and in concealed mounting locations such as behind grill, fender well, or under hood. Partially assembled. In gray baked epoxy finish. 4¾″ High, 4¾″ Wide, 12⅝″ Long. Shipping Weight 12 lbs.

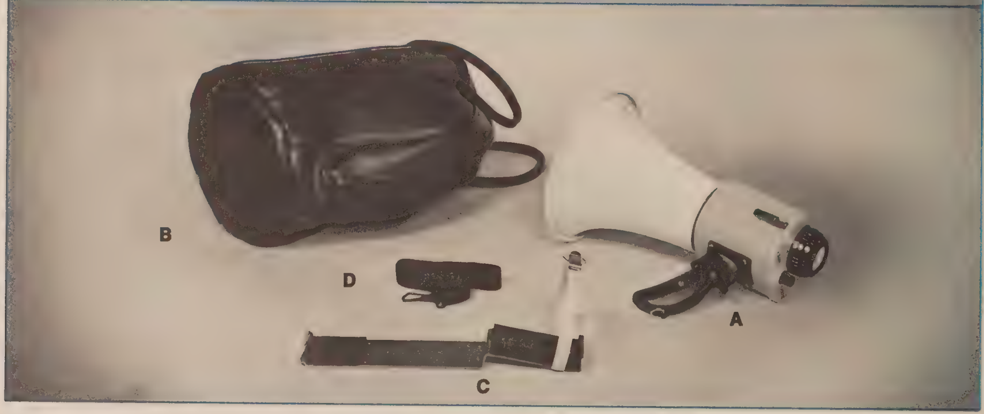
TDN-6253A Underhood Siren Loudspeaker

SPECIFICATIONS

Atlas Siren Loudspeakers

Power Rating: 100 Watts rms/180 Watts equalized. **Impedance:** 11 ohms, nominal (dc resistance, approx. 4.2 ohms). **Frequency Range:** 375-8000 Hz (approx.). Depending on model/shape. **Diaphragm:** Field Replaceable, Self-aligning (K-370). **Termination:** 3″ color coded lead wires. **Mounting:** Steel bracket, "L" shaped, 6 mounting holes.

AUDIO HAILER Megaphone and Accessories

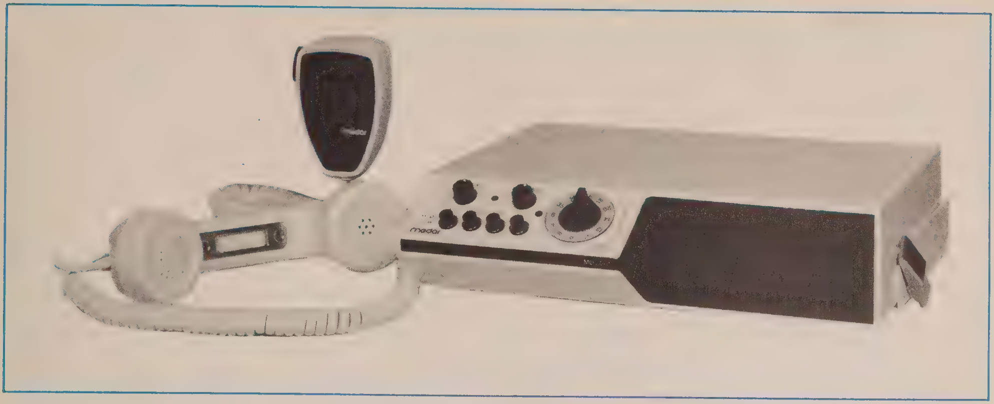


This rugged hand-held megaphone includes a self-contained battery compartment, microphone, and loud speaker. Twelve (12) "C" cell batteries (not included with the unit) generate the powerful 14 watts output.

The housing is painted with two tones of blue baked enamel. The reinforced chassis and printed circuitry ensure continued performance in most operating environments. An accessory carrying case, quick-action mounting kit, battery pack, and adjustable shoulder strap are available.

A	**SLN-6440A**	AUDIO HAILER Megaphone **Weight:** 5 lbs. (2.25 kilos) **Dimensions:** 13½″ length (34.4 cm) 8½″ diameter of bell (21.6 cm) **Power Output:** 14 watts **Power Source:** 12 "C" cell batteries (not included) **Color:** Two tones of blue
B	**SLN-6441A**	Naugahyde carrying case with non-ferrous zipper.
C	**SLN-6442A**	Storage rack mounting bracket.
D	**42-80320A88**	Adjustable shoulder strap (black).
	SLN-6443A	Battery pack kit (12 "C" batteries). Not shown in photograph.

MODAR, TRITON Accessories



Mounting Kits

Kits include all necessary hardware for mounting MODAR, TRITON Radio.

TLN-4789A	Mounting kit, bronze
TLN-4790A	Mounting kit, white

RF Indicator Kit

Contains the components necessary to add a true RF indicator to the TRITON Marine Radiotelephone. The kit samples RF energy from the radio and uses the detected voltage to control the lighting of the transmit lamp.

PK-709	RF Indicator kit

Light Dimmer Kit

Allows the operator to vary the illumination on the control panel as the outside light changes.

PK-710	Light dimmer kit

12 Channel Conversion Kit

Provides capability of six additional channels to either 6½ or 6 channel units. (crystals not included)

TLN-1437A	12 Channel conversion kit

Handset

White handset with coiled cord terminated in 6 pin tips.

TMN-6069A	Handset
TLN-4787A	Handset hang-up cradle

Handset Conversion Kit

Replaces microphone with handset. Provides better reception in noisy areas and provides private listening, if desired. (Handset cradle supplied with kit)

TLN-1439A	Handset conversion kit

Microphones

The same high quality as Motorola transistorized microphones . . . dynamic element with self-contained transistorized pre-amplifier for a high signal-to-noise ratio and high output.

TMN-6068A	Microphone with standard white coiled cord
TMN-6013A	Microphone with heavy duty black coiled cord
1-80751B99	Black coil cord, terminals, and push-to-talk switch used in TMN-6013A and available for use in adding heavy duty cable to TMN-6068A
1-16241	Microphone hang-up clip
TLN-4786A	Microphone hang-up box (MODAR, TRITON 25 watt)

AC Power Supply

Completely transistorized. Designed to operate from 120V, 60 Hz supply. Output voltage is 14.5 volts D.C., and the unit is capable of delivering 7.5 amperes. Supplied with TLN-5279A Connector Kit (6 pin connector).

T-1670A	AC Power Supply, 120V/60 Hz

DC Converter

Completely transistorized, operates from an unregulated voltage of 20Vdc to 45Vdc. The output is a fully regulated 13.6V,8 amperes filtered dc. Current limiting from overload to short circuit, overvoltage protection and reverse polarity protection are provided. Supplied with TLN-5279A Connector Kit (6 pin connector).

T-1671A	DC Converter

Remote Cable Kit

Supplied without a connector attached to the radio end of the cable (15 ft) to facilitate installation. The connector, terminal pins, and protective "boot" are supplied with the kit. Bulk cable and male and female connector kits are also available for custom installations.

TKN-6592A	Remote Cable Kit, 15 feet
PK-714	Male connector kit
PK-713	Female connector kit
30-4136C01	Cable, specify length (not to exceed 45 feet)

Replacement Parts Kit

Provides the more common parts necessary for servicing the TRITON radio. Intended as a start-up kit for service shops, the PK-694 provides sufficient parts for initial servicing of approximately 10 radios.

PK-694	Replacement parts kit

Parts Packet

Includes owner's manual, decals, schematic diagrams, etc.

TLN-4889A	Parts Packet

Miscellaneous Accessories

Numerous other items as listed below are available for your MODAR, TRITON Radio.

TKN-6572A	Power Cable Kit (all models)
TLN-5279A	Connector kit (6 pin) for T-1670A and T-1671A power supplies
TKN-6591A	Power Plug cable for dual remotes TCN-1108A through TCN-1111A
ST-946	Power Cable Pin Tool
ST-1145	Remote Cable Pin Tool
68-81019E65	Service Manual (Complete) for all TRITON products
15-83033K01	Molded TRITON Carrying Case
PK-774	Kit Carrying Case (Pack of 6 Cases)

MICOM/TRITON HF-SSB Accessories

MICOM HF-SSB Base Station Accessories

Manual Telegraph Key

The Manual Telegraph Key consists of a key assembly, mounting plate, and cable.

TRN-6271A Manual Key

Semiautomatic Telegraph Key

The Semiautomatic Telegraph Key automatically produces a series of dots whenever the handle of the key is pushed to the right. The number of dots and the length of dashes and spaces is controlled manually by the operator. The rate of dot speed, tension of the handle, and clarity of the dots and dashes are adjustable.

TRN-6272A Semiautomatic Key

Digital Clock

An electronic digital clock which utilizes a four-digit light emitting diode (LED) display. The clock can be jumpered for either 12- or 24-hour and 50 or 60 Hz operation.

TRN-6125A Digital Clock

RF Gain Control

A manual R-F Gain Control which mounts on the front panel. Allows manual adjustment of receiver sensitivity.

TRN-6250A Gain Control

Clarifier

This option adds a manual receiver clarifier control to the front panel. It is used to fine tune the receiver up to ±200 Hz as an aid in receiving signals from a transmitter which is slightly off-frequency.

TRN-6251A Clarifier

DC Operation

Includes cable required for 12 Vdc negative ground operation, as supplied with all standard models. (The digital clock option cannot be used with the dc stations.)

TPN-1144A DC Cable

Power Supply

Provides a dc output of 14.0V. Fully transistorized circuits protect the supply, and connected units, from damage due to excessive output current or voltage.

TPN-1144A Power Supply

SPECIFICATIONS

Output Voltage: 14V ±0.1V with maximum (non-continuous) load current of 25A. Ripple (at full rate load): 20mv (peak to peak). **Power Requirements:** 100, 110, 121, 200, 210, 221, 231, or 242 Vac (50 or 60 Hz.)

Phone Patch

The phone patch connects a land line telephone network with a radio system to allow direct telephone conversations with remote radio sites.

TRN-6309A	Phone Patch
TMN-6112A	Handset for phone patch

MICOM HF-SSB Mobile Radio/Fixed Mobile Radio

Handsets and Hang-up Boxes

Handsets supplied with coiled cord and 4 prong connector. Compatible Hang-up Box will be listed below Handset.

Trunk Mounting

TMN-6115A	Handset
TLN-6498A	Handset Hang-up Switch Box (SINAD Squelch)
TLN-4507A	Handset Hang-up Switch Box (QUIK-CALL Squelch)

Front Mounting

Front mounting. Uses same handset, with different hang-up switch box.

TLN-5843A	Hang-up Box (SINAD Squelch)
TLN-5844A	Hang-up Box (QUIK-CALL S Squelch)

Cable Kits

TN-6774A	Trunk Mounting (radio to fuses)
TKN-6775A	Cable and Connector Front Mtg. and Fixed Mobile.

TKN-6776A	Trunk Mounting and Front Mtg. and Fixed Mobile Lo Current
TKN-6458A	Trunk Mtg. and Front Mtg. and Fixed Mobile Hi Current

Microphone Kits

TMN-6114A	For Trunk Mtg. and Front Mtg. Mobiles—Supplied with Coiled Cord and 4 Prong Plug.
TMN-1014A	Desk Microphone Fixed Mobile.
TMN-1015A	Desk Microphone Fixed Mobile, with Dual Action Monitor Switch.

Speaker Kits

TSN-6023A	Supplied with 8′ of 2-Cond. Speaker Wire and 2-pin connectors.

Mobile Antennas

Single Channel

For single frequency operation. These 11-foot, 5-inch (3.5 meter) whip antennas include a choice of side or bumper mounts, 18-feet of RG-58A/U coaxial cable and a connector for the cable.

TAA-6011A	2.7-6.7 MHz
TAA-6012A	6-15 MHz

Six Channel

A bumper mount 10′5″ (3.2 meter) whip antenna with built-in six-channel tuner. Mounts and antenna cable for trunk-mounted radios (8 feet or 2.4 meter) are included. A cable kit is available for front (dash) mounted radios with cable 20 feet (6 meters) long. Up to two channels may be used in each range of 2 — 4.5 MHz, 4 — 9 MHz, and 8 — 18 MHz.

TAA-6000A	Six-Channel Antenna
TKN-6793A	Front-Mount Cable Kit

Twelve Channel

Whip antennas for flat surface mounting or side surface mounting. Length is 16 feet (4.9 meters). Recommended only for heavy duty vehicles operating in areas without overhead obstruction.

TDA-6030A	Flat-Surface Mount Whip
TRN-6439A	Mounting Hardware for TDA-6030 (order separately).
TDA-6040A	Side-Surface Mount Whip
TRN-6438A	Mounting Hardware for TDA-6040 (order separately).

Antenna Tuner

A binary-switched antenna tuner which is required to tune the antenna. An optional 25-foot (7.6 meter) control and coaxial cable is available for use with this system.

T-1820A	Antenna Tuner

Noise Reduction Kit

Provides instructions and components useful in reducing interference due to vehicle ignition noise. The kit includes coaxial capacitors, resistance wire, hoodwiper, and hardware.

TLN-8845A	Noise Reduction Kit

Ignition Relay Battery Saver

This option adds an ignition relay, to control battery voltage to the radio set, so that power is removed when the vehicle ignition switch is off. This prevents draining of the battery when the vehicle is turned off and the radio power switch is left on. It also provides protection against unauthorized use.

TRN-6178A	Ignition Relay

TRITON HF-SSB Marine Radiotelephone

Microphones and Handsets

Microphones are palm-type units with transistorized pre-amplifiers. The pre-amplifier is an integral part of the cartridge. Each microphone includes a coiled cord, a four-prong microphone connector, and a built-in push-to-talk switch.

TMN-6118A	Standard Microphone (indoor)
TMN-6121A	Same as above, but weather proof, splash proof, dust proof, and can be used in exposed locations.
TMN-6069A	Handset (white)
TLN-4787A	Handset Hang-up Cradle

AM Receiver

A plug-in board that permits the reception of AM double sideband signals (A3H or A3 emissions). The AM receiver includes a wide bandwidth crystal filter, amplifiers, an AM detector, and an independent AGC circuit with a dynamic range of 100 dB.

TRN-6240A	AM Receiver

Control Cables

TKN-6788A	30′ Control and Coaxial Cable
TKN-6789A	100′ Control
TKN-6857A	Single Remote 17′ Cable
TKN-6858A	Single Remote 30′ Cable

DC Cable Kits

TKN-6775A	Local
TKN-6776A	Cable and Fuse (Green) Lo Current
TKN-6458A	Cable and Fuse (Red) Hi Current

AC Power Supply

Provides an output of 13.85 Vdc that is fully regulated with as much as a ±20% variation in the AC line voltage. Fully protected against short circuits. Operates from either 50Hz or 60Hz with AC voltages of 100, 110, 120, 200, 210, 220, 230, or 240 Vac.

T-1828A	AC Power Supply

DC Converter

Converts 24 Vdc or 32 Vdc to 14 Vdc. Features fully regulated operation and remote switching capability plus reverse polarity and overload protection.

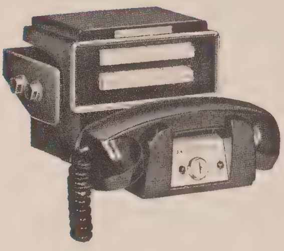
T-1829A	DC Converter

Antenna Modification Kits

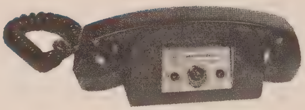
These kits are used to transform antenna impedances into the tuning range of the antenna tuner. (T-1818A, T-1820A and T-1827A.)

RPX-4007A:	Long Wire Antenna Cable Kit to tune long wire antennas up to 125 feet long from 1.6 MHz to 18 MHz.
RPX-4008A:	Whip Antenna Cable Kit to tune 23′ to 35′ whip antennas from 1.6 MHz to 18 MHz. (Whip antenna may normally be tuned from only 2 MHz to 18 MHz).

Car Telephone Mobile Control Units



Manual
Control Heads



Companion
TLN-1037A Rear
Seat extension.

Facts Control
Heads

Motorola Manual Control Head (M/T/S)

TCN-1013A†—Control unit with/Western Electric type handset, auxiliary ring relay and battery saver.*

TCN-1017A†—Control unit with/Western Electric type handset, auxiliary ring relay, battery saver and rear seat extension.*

TCN-1015A — Control unit w/Motorola handset, auxiliary relay and battery saver.*

TLN-1037A—Rear seat extension with Western Electric type handset and mounting bracket.*

TLN-6666A — Control head installation hardware.

VHF & UHF FACTS Control Head and Color Conversions

Used on T-1682 high band PULSAR radios and T-1436 450 MHz IMTS radios. Control unit incorporates letter and numeric readout, automatic and manual channel selection, call light, and aural and visual busy indications.

TCN-1142A	Decor (wood grain finish) control unit for T-1682 high band PULSAR Radio only—"PULSAR" label on handset.
PK-763	Decor conversion kit ("PULSAR" label) for control units.
TCN-1143A	Decor (wood grain finish) control unit for T-1436 450 MHz IMTS Radio only—"MOTOROLA" label on handset.
PK-764	Decor conversion kit ("MOTOROLA" label) for control units.

CONTROL UNIT MODEL NO.	HOUSING (FRONT SEC)	HOUSING (REAR SEC)	HANDSET (HOUSING WITH CAPS)	CORD (COILED)
TCN-1101A (Blk)	15-84234D01	15-84169E01	15-84107A10	30-84057A14
TCN-1102A (Beige)	15-84234D02	15-84169E02	15-84107A12	30-84057A16
TCN-1103A (Wht)	15-84234D03	15-84169E03	15-84107A11	30-84057A15
TCN-1105A (Grn)	15-84234D05	15-84169E05	15-84107A13	30-84057A17

*Available in Black only.

†Not supplied by the parts department. Please contact your Motorola representative for ordering assistance.

Motorola PULSAR Control Heads

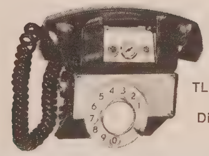
The Motorola PULSAR control head is compatible with PULSAR mobile radiotelephones, MJ series mobile radiotelephones (VHF), and MK series mobile radiotelephones (UHF). An adapter cable and minor modifications are required for complete compatibility in some applications. Complete installation and modification instructions are included. For use in 12-volt, negative ground vehicles only.

TCN-1162A	Black/Revertive Call/VHF
TCN-1163A	Beige/Revertive Call/VHF
TCN-1168A	Black/Revertive Call/UHF
TCN-1169A	Beige/Revertive Call/UHF

MOTOROLA
OFF
ON

150 MHz IMTS Control Head

450 MHz IMTS Control Head



TLN-1037A/SP2 Rear Seat Dial Extension

150 MHz IMTS Control Head and Color Conversions

WESTERN ELECTRIC TYPE	COLOR	MODEL NO.
TCN-6060A	Black	**TCN-6070A**
		***TCN-6090A**
TCN-6064A	Beige	**TCN-6074A**
		***TCN-6094A**

*Party call button in place of auxiliary button.

TLN-1037A/SP2 REAR SEAT DIAL EXTENSION—Parallels the handset, "off-hook" and dial functions of the dash mounted control head, thereby adding new convenience for IMTS car telephone users. In an IMTS operating area, the "Home" or "Roam" models allow full calling capabilities due to the channel hunting characteristics of IMTS operation. Manual calls may be placed on a channel selected from the master control head. Thus, calls may be made and received from either position in the vehicle. The rear seat extension dial lights when either handset is lifted from its cradle. "Power on" and "transmit" lamps duplicate the indications on the master control head. Adding the rear seat extension is simple in both new and existing installations. Available in black only.

See Test Equipment Section for Mobile Telephone Test Equipment

Color Conversion Kits for IMTS 150 MHz Band

KIT NO.	COLOR	FRONT HOUSING	REAR HOUSING	HANDSET & CORD
TEN-6060A	Black	15-82974H01	15-82974H08	50-83449A01
TEN-6061A	White	15-82974H02	15-82974H09	50-83449A02
TEN-6064A	Beige	15-82974H05	15-82974H12	50-83449A05
TEN-6076A	Green	15-82974H15	15-82974H17	50-83449A08
TEN-6077A	Gray	15-82974H16	15-82974H18	50-83449A09

NOTE: Kit includes front and rear housings and Motorola handset.

450 MHz IMTS Control Head and Color Conversions

Used on T-1407 450 MHz IMTS radios. Control units incorporate letter and numeric readout, automatic and manual channel selection, call light, and aural and visual busy indications.

TCN-1082A	Decor (woodgrain finish) control unit for T-1407 450 MHz IMTS radio.
PK-765	Decor conversion kit for control units.

CONTROL UNIT MODEL NO.	COMPLETE HOUSING*	FRONT HOUSING	REAR HOUSING	HANDSET & CORD
TCN-1071B (Blk)	THN-6091B	1-80788A24	15-83797H01	50-83968H01
TCN-1071B (Blk)	THN-6091B	1-80755B37		
TCN-1072B (Beige)	THN-6092B	1-80788A25	15-83797H02	50-83968H02
TCN-1072B (Beige)	THN-6092B	1-80755B38		
TCN-1073B (Wht)	THN-6093B	1-80788A26	15-83797H03	50-83968H03
TCN-1073B (Wht)	THN-6093B	1-80755B39		
TCN-1074B (Gray)	THN-6094B	1-80788A27	15-83797H04	50-83968H04
TCN-1074B (Gray)	THN-6094B	1-80755B40		
TCN-1075B (Grn)	THN-6095B	1-80788A28	15-83797H05	50-83968H05
TCN-1075B (Grn)	THN-6095B	1-80755B41		

*Includes front and rear housing less handset and cord.

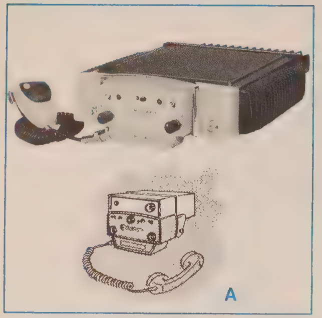
SP1001CNAA Rear Seat Extension Consists of:

One (1) SP4003CNAA Junction Box

Two (2) SP4098KNAA Cable Kits (1 cable from Junction Box to front seat; 1 cable from Junction Box to rear seat)

One (1) SP4099KNAA Cable Kit (Junction Box to radio)

Control Heads



Extended Control Console

A The Motorola Extended Control Console enhances safety and efficiency in vehicles such as fire trucks, utility vehicles and heavy construction equipment. The driver no longer needs to re-enter the cab to answer a call, receive instructions or summon assistance. He can now operate his mobile radio from outside of the vehicle. Separate handset and speaker volume controls allow the handset and optional speaker to be adjusted to comfortable levels independently of each other.

The T-1170A extended control console can be used with any carrier squelch,* trunk mount *Motran, Motrac,* or *Mocom* radio with up to four-frequency transmit and receive capability. The transfer head mounts compactly to the radio control head. The console itself can be mounted up to 22 feet away from the transfer head.

The Motorola extended control console is completely weatherproof. The console and optional speaker-amplifier are also gasket-sealed against dirt, dust, and moisture for maximum protection against year-round adverse weather conditions.

The extended control console can be used in conjunction with the Motorola electronic siren/pa as well as the optional speaker-amplifier to alert the operator to incoming messages even under conditions of high ambient noise.

T-1170A	Standard Squelch Extended control console accessory group. Consists of extended control console, transfer head, cable kit, and weatherproof handset
TCN-6135A	Standard squelch extended control console
TCN-6134A	Transfer head
TMN-6047A	Weatherproof handset
TKN-6415A	Cable kit (22 ft.)

*"PL" models available on special order.

MOTRAN, MOTRAC and MOCOM Radio Control Heads

Note: All control heads listed are less microphones. Two-frequency units can be used for either 1 or 2-frequency replacements.

Front Mount-Standard Squelch

MOTRAC MOTRAN	MOCOM•70	DESCRIPTION
TCN-6027AF		2-freq. 6V
TCN-6025AF		2-freq. 12V
	TCN-6141BF*	2-freq. 12V
TCN-6097BF*		2-freq. 12V
	TCN-6141BJ*	4-freq. 12V

(Extender Models)

MOTRAC MOTRAN	MOCOM•70	DESCRIPTION
TCN-6048BF*		2-freq. 12V
	TCN-6142BF*	2-freq. 12V
TCN-6099AF*		2-freq. 12V
	TCN-6142BJ*	4-freq. 12V

Front Mount PRIVATE-LINE Dual Squelch

MOTRAC MOTRAN	MOCOM•70	DESCRIPTION
TCN-6025AH		2-freq. 12V
	PK-625 (Repl. TCN-6141AH*)	2-freq. 12V
TCN-6097BH*		2-freq. 12V
	PK-626 (Repl. TCN-6141AK*)	4-freq. 12V

(Extender Models)

MOTRAC MOTRAN	MOCOM•70	DESCRIPTION
TCN-6048BH		2-freq. 12V
	PK-628 (Repl. TCN-6142AH*)	2-freq. 12V
TCN-6099AH*		2-freq. 12V
	PK-629 (Repl. TCN-6142AK*)	4-freq. 12V

MOTRAC, MOTRAN, MOCOM•70 Rear-Mount-Standard Squelch

MODEL NO.	DESCRIPTION
TCN-6026BE	1-freq. 12V
TCN-6030BF	2-freq. 6V
TCN-6026BF	2-freq. 12V
TCN-6098CF*	2-freq. 12V
TCN-6098CJ*	4-freq. 12V

(Extender Models)

MODEL NO.	DESCRIPTION
TCN-6046CE	1-freq. 12V
TCN-6046CF	2-freq. 12V
TCN-6100CF*	2-freq. 12V
TCN-6100CJ*	4-freq. 12V

(Simultaneous Monitor Model)

MODEL NO.	DESCRIPTION
TCN-6118CF	2-freq. Neg. Gnd. only

MOTRAC, MOTRAN, MOCOM•70 Rear-Mount-PRIVATE-LINE Dual Squelch

MODEL NO.	DESCRIPTION
TCN-6026BG	1-freq. 12V
TCN-6030BH	2-freq. 6V
TCN-6026BH	2-freq. 12V
TCN-6098CH*	2-freq. 12V
TCN-6098CK*	4-freq. 12V

(Extender Models)

MODEL NO.	DESCRIPTION
TCN-6046CB	1-freq. 12V
TCN-6046CH	2-freq. 12V
TCN-6100CH*	2-freq. 12V
TCN-6100CK*	4-freq. 12V

(Simultaneous Monitor Model)

MODEL NO.	DESCRIPTION
TCN-6118CH	2-freq. Neg. Gnd. only

MOCOM•30 Front Mount-PRIVATE-LINE Dual Squelch

MODEL NO.	DESCRIPTION
TCN-6132AG	1-freq. 12V

Front Mount Control Head for T-POWER Mobiles

(Less Microphone)

This control head is designed to permit front mount operation of a universal U41, U43GGT, etc. series. It is available less microphone with a four prong receptacle for a "Plug-in" mike or handset.

MODEL NO.	DESCRIPTION
TCN-6000AH	2-freq.—Dual Squelch
TCN-6000AF	2-freq.—Std. Squelch

Rear Mount Control Head for General Replacement

(Less Microphone)

Will replace both pad and DC type volume control models used with Standard or PRIVATE-LINE squelch units. Available without microphone.

MODEL NO.	DESCRIPTION
TCN-6001AH	2-freq.—Dual Squelch
TCN-6001AF	2-freq.—Std. Squelch

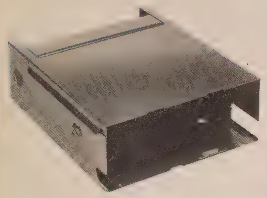
*Models indicated by an asterisk (*) have automatic dimmer light feature.

Motorola "Channel Scan" Monitor

The Motorola "Channel Scan" monitor allows automatic scanning of two or four receiver channels with a priority channel selected by a front panel switch. Motorola "Channel Scan" units can be used with later MOTRAC (LHT series to date) MOTRAN, and MOCOM 70 trunk mount radios. Not compatible with 8 and 12 channel VHF and UHF MOTRAC radios with wide channel transmitters. The scanner mounts compactly above the control head.

T-1156B	Two channel scan (with priority) for two frequency radios.
T-1157B	Two channel scan (with priority) for radios capable of four frequencies.
T-1159A	Four channel scan (with priority) for four frequency radios.

Standard Mobile, Weatherproof Housings and Accessories



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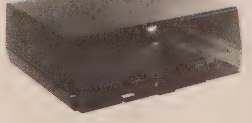

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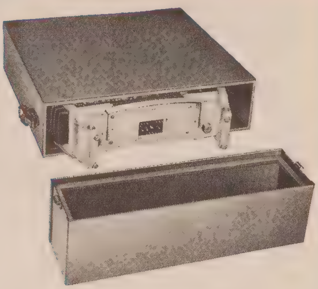
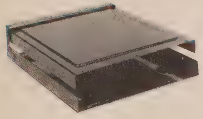


"Motrac" Radio Weatherproof Housing



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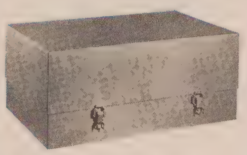
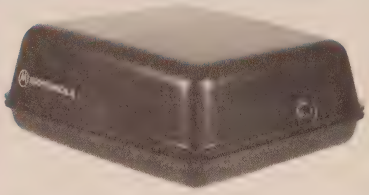


TK-272 Weatherproof Housing



MCR-100 Motorcycle Housing

Standard Mobile Housings

Standard 10″ & 15″ mobile housings for basic protection of mobile units. They are rigidly constructed of cold rolled steel. Perfectly matched split-type housings for replacement of original factory equipment.

FIG.	MODEL	DESCRIPTION
(A)	**THN-6028A**	Business "Dispatcher" Radio
(B)	**THN-6002A**	"Motrac" Radio Housing
(C)	**THN-6171A**	IMTS "Pulsar" Radio Housing

Weatherproof Housings

These weatherproof housings offer maximum protection to the equipment under the most adverse weather conditions. They are rigidly constructed of cold rolled steel and feature two heavy duty hasps for security purposes. The cover is completely sealed by the use of gaskets and the complete housings are attractively finished in a gray wrinkle enamel.

Note: 10 inch "T-Power" Units should be installed in 15 inch weatherproof housing only with standard housing cover removed and TK-363 hold-down kit to secure unit case.

MODEL	DESCRIPTION	OUTSIDE DIMENSIONS	COLOR
TK-272	For 10″ housing	21x13x9″	Gray
K-8696	For 15″ housing	23x19x8¾″	Gray

MOTRAC, MOTRAN, and MICOR Radio Weatherproof Housings

Especially designed for maximum dissipation of heat. Housing includes weatherproof cable outlet and new "heat sink" as required.

MODEL	DESCRIPTION
THN-6072A	For 30, 40, 50 and 60 watt 25-54 MHz units and 25 and 4 watt 150-174 MHz MOTRAC
THN-6020A	For 100 watt low band and 60-110 watt high band and all 450 MHz MOTRAC
THN-6064A	For MOTRAN Radio (Except 450 MHz)
THN-6111A	For MOTRAN 450 MHz "MST" series (4-freq. models only)
15-84912C01	For MICOR radio, requires TLN-4570A Hdwe. Kit (Repl. THN-6127A)
TLN-4570A	Hdwe. Kit or THN-6127A

Weatherproof Cable Outlet Kit

Provides a weatherproof entrance for power and control cables.

MODEL	DESCRIPTION
K-8699A	Cable entrance kit (hose type)

Motorcycle Radio

MODEL	DESCRIPTION
THN-6182A	For motorcycle radio MCR-100, weatherproof housing, black structural foam, includes metal antenna ground plane.

Accessories

Housing Hold Down Kit

MODEL	DESCRIPTION
TK-363	Housing Hold-Down Kit

Standard Installation Kits (Rigid Mount)

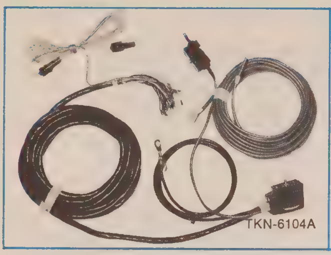
MODEL	DESCRIPTION
TLN-6000A	Installation Kit, Standard Mobile
TLN-6001A	Mounting Bracket Kit (10″ mobiles)
TLN-6238A	Mounting Brackets, Front Mt. "Motrac" Radio
TLN-6380A	Installation Kit, Business "Dispatcher" Radio
TLN-6042A	Installation kit "Motrac" Radio

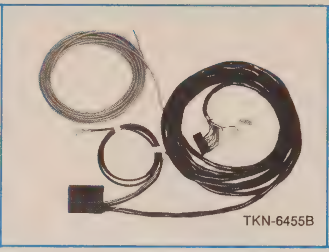
Shockmount Kit

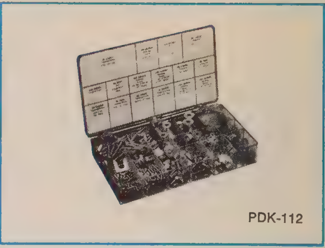
Protects 10″ radio units subjected to excessive vibrations; includes all equipment necessary for a shock mount installation.

MODEL	DESCRIPTION
TK-404	For 10″ K9045 housing

Mobile Cable Kits


TKN-6104A


TKN-6455B


PDK-112

Trunk Mount Cable Kits for MOTRAC, MOTRAN and MOCOM 30 & 70 Radio

MODEL NO.	DESCRIPTION
TKN-6058A	6 volt, 1 or 2 freq. 25, 30 & 50 watt units
TKN-6105A	12-volt 1, 2, & 4 freq. 25, 30 and 50 watt units (20 foot)
TKN-6923A	12-volt 1, 2, & 4 frequency MOCOM 70 radio (20 foot). Requires TKN-6458A cable and fuse.
TKN-6104A	12-volt 1, 2, & 4 freq. 60, 80 and 100 watt units (20 foot)
TKN-6076A	24-volt 2 freq. 25 watt units (17 foot)

MICOR Radio Control and Power Cables

MODEL NO.	DESCRIPTION
TKN-6453B	1 freq. cable—22 feet long (replaces TKN-6452A)
TKN-6455B	Multi-frequency cable—22 feet long (replaces TKN-6454A)
TKN-6456A	Control head power cable
TKN-6457A	Cable and fuse (low power radio)
TKN-6458A	Cable and fuse (high power radio)
TKN-6470B	Multi-frequency cable—22 feet long—positive ground
TKN-6483B	Multi-frequency cable—22 feet long—negative ground Micor with Motrac Accessories
TKN-6484B	Multi-frequency cable—22 feet long—positive ground Micor with Motrac Accessories
TKN-6548A	8 freq. cable—18 feet long—(wide spaced rcvr models only)

Dash Mount Cable Kits

MODEL NO.	DESCRIPTION	APPLICATION
TK-191	12-volt, 1 or 2 freq.	D43G, GGV series

CABLE KITS FOR TLN-6014A CONVERTER For U41GGT, U43GGT, U44BBT and U51GGT 18, 25, 30, 50-60 Watt Units "T-Power" Series Radio.

TKN-6013A	Trunk-mounted converter, trunk mount radio
TKN-6014A	Engine-mounted converter, dash mount radio

Maxar Cables

TKN-6783A	Power Cable Kit (10 Watt)
TKN-6794A	Power Cable Kit (25 Watt)

Cable Kits for IMTS Mobile Equipment

MODEL NO.	DESCRIPTION
TKN-6142C	Cable kit, 20 ft. negative ground. (For Internal Supervisory Unit) (Replaces TKN-6130B) 150 MHz
TKN-6157B	Cable kit, 20 ft. neagtive ground for battery saver. 150 MHz
TKN-6370A	20 ft. cable assembly, negative ground. (450 MHz).
TKN-6475A	Cable kit (neg. grnd. for 150 MHz). (neg. grnd.) for 450 Hz radio unit. (FACTS System)
TKN-6368B	Cable kit (negative ground for 150 MHz). Radio Common Carrier (T-1353B)

Business DISPATCHER and MOCOM Radio

MODEL NO.	DESCRIPTION
TKN-6100A	Business "Dispatcher" Radio (All Models)
28-48250	Right Angle Connector Kit used with TKN-6100A
TKN-6329A	"Mocom-10," 12-volt Low Band
TKN-6445A	"Mocom-10 & 35," 12-volt High Band & 450 MHz

Ground Reversing Kits

MODEL NO.	DESCRIPTION
TLN-8482A	For "MOTRAC/MOTRAN" radio
TLN-4390B	For "MICOR" radio

Miscellaneous Cable Kits

MODEL NO.	DESCRIPTION
TKN-6614A	Pulsar radio power and control cable, 25 ft. negative ground.
TKN-6690A	Rear control cable assembly for Emergency Medical System, 20 ft.
TKN-6572A	Power cable kit, all models Modar Triton radio
TKN-6592A	Remote cable kit for Modar Triton radio, 15 ft.

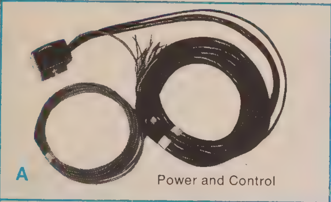
Mobile Installation Hardware Kit

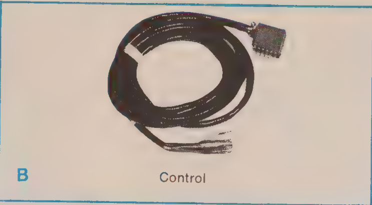
Forget about lost or missing installation hardware with this time and trouble saver! Each kit contains a generous supply of all the hardware you need for mobile installations—600 pieces in all, including a handy, 13-compartment plastic case. Self-tapping screws, bolts, washers and bushings of every useful size are supplied as well as 10 microphone hang-up plates. The contents of each compartment are identified by Motorola part number and description. This kit is a "must" in the shop and in every service van.

PDK-112

Vibrator & Dynamotor T-POWER Radio

MODEL NO.	REPLACEMENT FOR	DESCRIPTION	APPLICATION
TKN-6001A	TK-154, TK-202 series, TKN-6000A	6-volt, 20 ft. 1 or 2 freq.	All 6/12 450-470 MHz 18-20 watt
TKN-6003A	TK-156, TK-203 series, TKN-6002A	12-volt, 20 ft. 1 or 2 freq.	T51G, T51GGV series 50 to 60 watt
TKN-6005A	TK-208, TK-161 series, TKN-6004A	6-volt, 20 ft. 1 or 2 freq.	T41G, GGV series T43G, GGV series
TKN-6007A	TK-209, TK-162 series, TKN-6006A	12-volt, 20 ft. 1 or 2 freq.	U41GGT, U43GGT series 10 and 25 watt
TKN-6009A	TK-313 series	12-volt, 20 ft. 1 or 2 freq.	T43AAD, T43GAD T51GGD series T53GKT, T71GJT, "T-Power," 60 & 100 watt


A
Power and Control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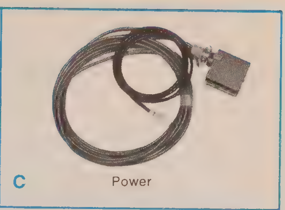
Control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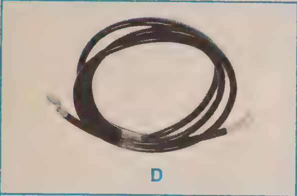
Power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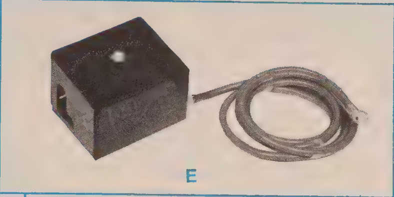
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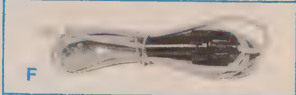
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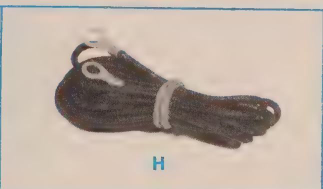
G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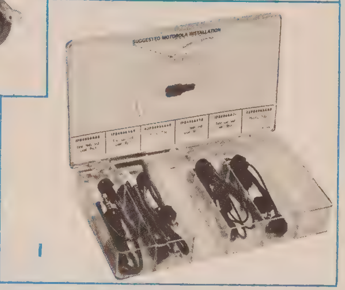


I

Power and Control Cable Kits

MODEL NO.	FIG.	DESCRIPTION
1-80710A82 (12V)	A	1 or 2 Freq. for all 12-Volt T-POWER 10″ Housings
1-80721A69 (12V)	A	20 ft., 1 or 2 Freq. for 80 & 100 watt MOTRAC
1-831573	B	20 ft., 1 or 2 Freq. for all Vibrator, 6/12 Models in 15″ Housings
1-859419	B	20 ft., 1 or 2 Freq. for all Dynamotor and T-POWER Models
1-831574 (6V) **1-831576 (12V)**	C	20 ft., 1 or 2 Freq. for all T51GGV and T44A series 6/12-Volt Models
1-865351 (12V)	C	20 ft., 1 or 2 Freq. for 12-Volt Dynamotor Models and T-POWER Mobile Units (High Power)

Miscellaneous Cable Assemblies

MODEL NO.	FIG.	DESCRIPTION
1-832065	D	3 ft. Long #10GA Cable 12-Volt T43GGV and T51GGV and other similar units
1-832063	D	2 ft. Long #10 blk. with ⅜″ dia. lug and #8 lug
1-859440	E	Relay & Fuse Assembly 6- or 12-Volt (Horn type Relay)
1-859445	E	Relay & Fuse Assembly 12-Volt only (Horn type Relay)
1-80705A18	F	In-line fused lead, 106″ overall. Consists of #18 green wire, #19 pin one end and ring tongue lug on other. Used on rear mount MOTRAC radio control head.
1-859441	F	In-line Fused lead w/pin #6 and Lug for Horn type Relay
1-858087	F	In-line Fused lead w/pin #6 and Lug for Solenoid Relay
1-80710A79	F	5 ft. Long #10 red with 20 amp in-line fuse and holder with a #8 lug and a ⅜″ lug
1-80705A19	F	67″ overall in-line fuse lead #18 orange, 6¼ amp fuse. One end has a #8 ring tongue lug, the other has a #20 term pin. (Replaces 1-80705A06
1-859428 **1-80710A80**	G	Relay lead, 68 in. long w/pin #5 and Lug 68″ #20 pin lead with #8 ring tongue lug. The other has a #6 pin
1-830178	H	One each of Fig. "F & G" for Horn type Relays
1-847414	H	Ignition Switch Lead, 5 ft. long w/lugs

Clip-On Fuse Kit.

I *Don't rewire* . . . just because part of the in-line fuse has deteriorated, and you haven't enough slack. The PDK-1116 provides you with a quick, easy method of replacing in-line fuse holders. The fuse bodies and caps have 9″ leads with crimp splices on the leads. Straps are included for tieing back hanging slack. Just remove the faulty part, strip off ¼″ of insulation, and crimp on the new assembly.

PDK-1116 Clip-On Fuse Kit.

Each PDK-1116 Clip-On Fuse Kit consists of:

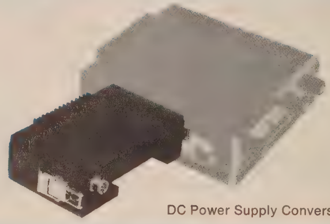
PART NO.	QUANTITY	DESCRIPTION
1-84066A68	5	Heavy Fuse Body and Lead
1-84066A69	5	Heavy Fuse Cap and Lead
1-84066A70	5	Light Fuse Body and Lead
1-84066A71	5	Light Fuse Cap and Lead
42-84066A60	6	Panduit Straps

Motorcycle and Industrial Solid-State "Dispatcher" Accessories

Control and Speaker Units

Mounting and Installation Kits

Microphones



DC Power Supply Conversion Kit

Control and Speaker Units

MODEL NO.	DESCRIPTION
NSN-6016A	Speaker Unit, Weather-Proof, W/ Connector and interconnecting Radio and Power Source Cabling (Industrial Local Control)
NCN-6076AE	Control and Speaker Unit, Solocycle, Single Frequency, Standard Squelch
NCN-6076AF	Control and Speaker Unit, Solocycle, Two Frequency, Standard Squelch
NCN-6076BG	Control and Speaker Unit, Solocycle, Single Frequency, "Private-Line" Dual Squelch
NCN-6076BH	Control and Speaker Unit, Solocycle, Two Frequency, "Private-Line" Dual Squelch
NCN-6078AE	Control and Speaker Unit, Servi-Car, Single Frequency, Standard Squelch
NCN-6078AF	Control and Speaker Unit, Servi-Car, Two Frequency, Standard Squelch
NCN-6078BG	Control and Speaker Unit, Servi-Car, Single Frequency, "Private-Line" Dual Squelch
NCN-6078BH	Control and Speaker Unit, Servi-Car, Two Frequency, "Private-Line" Dual Squelch

Mounting and Installation Kits

MODEL NO.	DESCRIPTION
NLN-6602A	Installation Kit for 1960 Thru Current for Solocycle (For Rear Fender Mounting)
NLN-6603A	Installation Kit for 1960 Thru Current for Servi-Car
NLN-6604A	Installation Kit for 1965 Thru Current for Solocycle (For Saddlebag Mounting) (Includes Radio Mounting Rack; Saddlebags are not Included)
NLN-6605A	Mounting Rack (With Key-Lock; for Servi-Car or Industrial)
NLN-6611A	Remote Push-To-Talk Switch Kit Includes: Handle Bar-Mounted Push-To-Talk Switch, Cable, and Microphone Hang-Up Clip to mount on Control-Speaker Unit Grill
TLN-5684A	Remote Push-To-Talk Switch Includes: Handle Bar-Mounted Switch, Cable, and Microphone Hang-Up Clip to mount on Control Speaker Grill. (Same as above except for MCR-100 Motorcycle Radio—used with TMN-6102A)
NLN-6566A	Trunion Mounting Kit (Industrial)
NLN-6601A	Mounting Plate Kit, for Blind Wall Mounting of Radio (Industrial)
NLN-6609B	Shock Mounting Kit, for Horizontal Mounting of Radio—Order Required NLN-6605A Mounting Rack Separately (Industrial)
NLN-6610B	Shock Mounting Kit, for Vertical Mounting of Radio—Order Required NLN-6605A Mounting Rack Separately (Industrial)

Microphones

MODEL NO.	DESCRIPTION
NMN-6032A	Microphone, W/Coiled Cord and Connector, Weather-Proof (Industrial) 6 Pin Plug
NMN-6034A	Microphone, Same As Above, W/ Automatic P.L. Disable (Industrial)
NMN-6006A	Microphone, W/Coiled Cord, Black, Weather-Proof for Motorcycle. 4 Pin Plug
NMN-6015A	Same as above except for industrial use. Color: Driftwood and Blue grey. 4 Pin Plug
TMN-6102A	Remote Push-To-Talk Microphone, w/Coiled Cord, Black Weather-Proof for Motorcycle. 4 Pin Plug. (Requires Remote Push-To-Talk Switch—order TLN-5684A)

DC Power Supply Conversion Kit

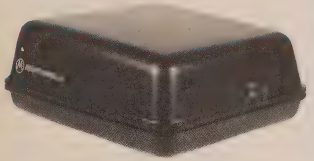
Converts 12-volt solid state industrial dispatcher radio units to operate from 24 to 72 volt sources. Unit mounts directly on the radio.

MODEL NO.	DESCRIPTION
NPN-6044B	Power supply, 24-72VDC (Maximum voltage input 86VDC)

MCR-100 Motorcycle Radio Accessories

SQUELCH
VOLUME
MOTOROLA

MCR-100 Motorcycle Radio



Weatherproof Housing

Unity Gain 153-162 MHz

Unity Gain 450-470 MHz

5 dB Gain 450-470 MHz

Microphones

MODEL NO.	DESCRIPTION
NMN-6006A	Microphone w/Coil cord, black, weatherproof.
TMN-6102A	Microphone used for Remote Push-To-Talk operation (TLN-5684A Remote Push-To-Talk Switch Kit required).

Control Head Speaker Units

MODEL NO.	DESCRIPTION
TCN-1134A	Control & Speaker Unit, one frequency, Standard Squelch.
TCN-1135A	Control & Speaker Unit, one frequency, "Private-Line."
TCN-1136A	Control & Speaker Unit, two to ten frequency, Standard Squelch.
TCN-1137A	Control & Speaker Unit, two to ten frequency, "Private-Line."

Weatherproof Housing

MODEL NO.	DESCRIPTION
THN-6182A	Weatherproof Housing with shock mounts, lock and key.

Installation Kits

Installation kits include all necessary hardware to mount weatherproof housing and control head to desired bike. For unusual installation requirements contact your Motorola representative.

MODEL NO.	DESCRIPTION
TLN-5461A	Rear Fender—Harley Davidson.
TLN-5462A	Rear Fender—Moto Guzzi.
TLN-5463A	Rear Fender—Honda 750 Four.
TLN-5464A	Servi-Car and Three Wheeler.
TLN-5642A	Saddlebag (Harley Big Bag Only). Includes Shock Mount Panel and Antenna Bracket. Does **not** include Saddlebags.

Antennas

Although helpful, exact frequency is not required.

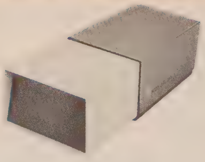
Supplied with 4 ft. of RG-58/U cable and PL-259 UHF Connector.

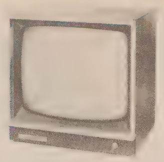
MODEL NO.	DESCRIPTION	
TAD-6212A	Unity Gain	146-152 MHz
TAD-6213A	Unity Gain	153-162 MHz
TAD-6214A	Unity Gain	163-174 MHz
TAE-6122A	Unity Gain	450-470 MHz
TAE-6082B	5 dB Gain	450-470 MHz

Miscellaneous

MODEL NO.	DESCRIPTION
TLN-5684A	Remote Push-To-Talk Switch (includes handle bar-mounted Switch, Cable, & Microphone hang-up clip to mount on control speaker grill).
NLN-6850A	Bracket for Saddlebag Antenna Mount (included in TLN-5642A kit).
TLN-1600A	Time-Out-Timer Field Installation Kit. Includes time-out-timer board and necessary hardware to mount in radio.
TKN-6675A	Cable Kit (control and power).

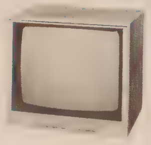
Closed Circuit Television Accessories

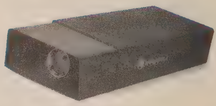

Low-Light-Level Camera

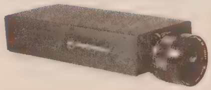

19″ Monitor

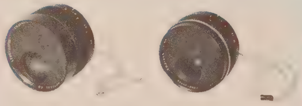
9″ Monitor

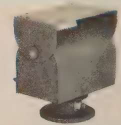
Lenses

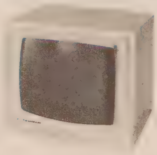

14″ Monitor

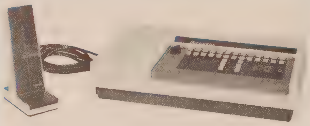

Economy Camera

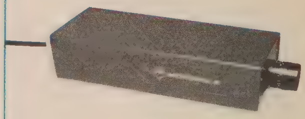

General Purpose Camera with Auto-Iris Lens


Auto-Iris Lenses


Remote Control Pan-and-Tilt Units


12″ Monitor


Digital Control Encoder with Microphone


General Purpose Camera

Parts, Kits and Accessories

A complete supply of replacement kits and replacement parts are available for the following:

MODEL NO.	DESCRIPTION
S-1140B	High-Performance Camera
S-1141A	Vidicon Camera
S-1145A	High Performance Diode Array Camera
S-1160A/61A	General Purpose Vidicon Camera
S-1162A	General Purpose Diode Array Camera
S-1170C	Single Intensified Vidicon Camera
S-1171B	Dual Intensified Vidicon Camera
Q-2111 & 12	Maximum Security Cameras
S-1219A	19″ High Performance Monitor
S-1244A/45A	14″ High Performance Monitor
S-1252A/53A	9″ High Performance Monitor
S-1269A	12″ High Performance Monitor
S-1264A/5A/6A/7A	Digital Encoders
S-1268A	Digital Weatherproof Decoders
S-1238A	Area surveillance Control Console
S-1239A	Gate Watch Control Console
SDN-6195A/6A/7A/8A	Pan and Tilt Units
SDN-6337A	Pan and Tilt (SDN-6198A) with Heater

Vidicon Kits

MODEL NO.	VIDICON TUBE
S-1140B	**65-82292D01** (same as SLN-6183A)
S-1141A	**97-82456F01** (same as SLN-6181A)
S-1142A/43A & 44A	**97-82640F01** (same as SLN-6191A)
S-1145A	**97-84871E01** (same as SLN-6530A)
S-1146A	**97-84870E01** (same as SLN-6528A)
S-1160A/61A	**97-82640F01** (same as SLN-6191A)
S-1162A	**97-30028A01** (same as SLN-6528B)
S-1170C/72A & 73A	**SLN-6194A** Single Intensifier
S-1171B	**SLN-6513A** Dual Intensifier Assembly

Picture Tube Kits

MODEL NO.	CRT TUBE
S-1219A	**96-138A01** (same as 19EBP4)
S-1252A/53/54/55A	**96-208A01** (same as CE110 M9P4S & SC5904A)
S-1245A	**96-219A01** (same as CE176A-M14P4T & ST4730C)
S-1269A	**96-233A01** (same as 12ST5449P4A)

Heater Kits

PK-732	20 Watt Heater Kit for S-1170A Series Low Light Level Camera
PK-744	Heater Kit for Front Window of Outside Camera SHN-6112A, SDN-6172A and SDN-6173A Housings

Camera Accessories for S-1140B and S-1141A

MODEL NO.	DESCRIPTION
SCN-6127B	Local Control Unit
SLN-6172A	Remote Junction Unit
SLN-6176A	Camera Service Kit
SLN-6175A	Adjustable Environmental Camera Mount
SHN-6112A	All-Weather Camera Housing
SDN-6170A	Explosion Proof Camera Housing

Vidicon Camera Accessories

SLN-6354A	Hood Extension Kit (S-1170A)
SLN-6534B	Hood Extension Kit (S-1170C or S-1171B)
SLN-6548A	2:1 Zoom Range Kit
SLN-6196A	Lens Hood Kit (S-1160A/61A)

Camera Mounts

SDN-6178A	Universal Indoor Mount
SDN-6180A	Wall Mount For Environmental Housing
SDN-6181A	Ceiling Mount For Monitors & Explosion Proof Housing
SDN-6182A	Ceiling Mount For Light Duty Indoor Pan/Tilt
SDN-6188A	Tripod with Friction Head
SDN-6192A	Friction Head

Monitor Accessories

SCN-6129A	Camera Control Panel For 19″ Monitor
SLN-6149A	Rack Mount Adapter For 19″ Monitor
SLN-6162A	Hood & Polarized Glass For 19″ Monitor

Single Camera Control Unit Accessories

SLN-6137A	Rack Mount Adapter For S-1238A or S-1239A
SLN-6138A	Speaker/Microphone For S-1239A
SLN-6139B	Weatherproof Cable Termination Unit

Coax and Control Cables

SDN-6200A	RG59B/U Coax Cable, Less Connectors
SDN-6201A	Double-Shielded Polyfoam Triax Cable Less Connectors
SDN-6202A	9-Conductor Control Cable
SDN-6203A	16-Conductor Control Cable
SDN-6204A	23-Conductor Control Cable
SDN-6205A	29-Conductor Control Cable
SDN-6305A	Shielded, Twisted Pair Cable

Coax Connectors

SLN-6154A	Male, UHF For RG59B/U Coax (1 Pair)
SLN-6155A	Male, UHF For Double-Shield Coax (1 Pair)
SDN-6206A	BNC To UHF Adapter UG/225/U

Video Tape Recorder Accessories For 1VC800

SDN-6262A	60 Minute Video Tape
SDN-6264A	Empty Reel
SDN-6265A	Microphone With 25′ Cable & Connector
SDN-6266A	Video Replacement Head
SDN-6267A	Maintenance And Service Manual

Lenses

MODEL NO.	FOCAL LENGTH	APERTURE	HORIZ. COVERAGE DEGREES	VERTICAL COVERAGE DEGREES
Fixed Lenses				
SLN6199	1″ fl. 9 with ½″ & 2″ ADAPTERS			
SDN6273	¼″ (6.5mm)	f/1.8-f/22	98	77
SDN6329	⅜″ (8mm)	f/1.8-f/22	84	63
SLN6503	½″ (12.5mm)	f/1.4-f/16	54	40.5
SLN6535	1″ (25mm)	f/1/9-f/22	28	21
SLN6504	1″ (25mm)	f/1.4-f/16	28	21
SDN6295	2″ (50mm)	f/1.2-f/16	14	10.5
SDN6146	3″ (75mm)	f/1.8-f/22	12	8
SDN6147	4″ (100mm)	f/2.0-f/22	7.15	5.37
SDN6303	LENS EXTENDERS (40mm, 20mm, 10mm, 5mm, 1.0mm lengths)			
High Speed Fixed Lenses				
SDN6335	1″ (25mm)	f/0.85-f/16	28	21
SDN6144	1″ (25mm)	f/0.78-f/11	28	21
SDN6336	2″ (50mm)	f/0.7-f/11	14	10.5
Auto/Iris Lenses				
SLN6510	½″ (12.5mm)	f/2.4-f/16	53.8	41.6
SLN6509	1″ (25mm)	f/1.4-f/16	28.5	21.5
SDN6157	2″ (50mm)	f/2.8-f/16	14.3	10.5
Auto/Iris Power Supplies				
SPN6106	Automatic Iris Lens Power Supply for S1140 or S1141			
SPN6113	Automatic Iris Lens Power Supply for S1160 or S1161			
Controlled Iris Lenses				
SLN6538	½″ (12.5mm)	f1.4-f/22	53.8	41.6
SLN6539	1″ (25mm)	f1.4-f/16	28.5	21.5
SLN6605	5:1 Zoom	f1.8-f/22	4.5-43.3	3.5-33.1
SLN6540	10:1 Zoom	f1.8-f/22	7.1-34	5.3-26
Motorized Zoom Lenses				
SDN6321	5:1 Zoom	f 1.8	7.1-34	5.3-26
SDN6302	10:1 Zoom	f 1.8	4.5-43	3.6-30
Servo-Controlled Spot Filter Lenses				
SDN6351	½″ (12.5mm)	f/2.4	53.8	41.6
SDN6352	1″ (25mm)	f/1.4	28.5	21.5
SDN6353	2″ (50mm)	f/2.8	14.3	10.5
SDN6354	5:1 Zoom	f/1.8	7.1-34	5.3-26

Accessories for ½″ Video Tape Recorders

MODEL NO.	DESCRIPTION
SDN-6291A	60 Minute ½″ Video Tape
SDN-6292A	Microphone
SDN-6293A	Empty Reel
SDN-6294A	Time & Date Generator

Isolation Kits

SFN-6025A	AC Line Isolation Kit
SFN-6026A	Coaxial Line Isolation Kit
SFN-6027A	Hum and Transient Isolation Kit
SLN-6555A	Camera Isolation Kit

Digital Control Systems, Control Encoder Options

B-1251A	Centracom Adapter
SLN-6561A	Pan and Tilt Control
SLN-6563A	Zoom Lens Control
SLN-6564A	Lens Focus Control
SLN-6565A	Lens Iris Control
SLN-6571A	Four-Position Universal Accessory Control Autoscan
SLN-6576A	Service Extender Board For SLN-6557A
SLN-6590A	Ten Site Expander (S-1265A and S-1267A only)
SLN-6592A	Control Center Adapter
SLN-1111A	Single-Site to Ten-Site Conversion Kit
SLN-1113A	PSK Modulator
SLN-1115A	Coax RF Modulator
TLN-5370A	Service Extender Board for Modules
TLN-1514A	Handset
TMN-1004A	Desk Microphone

Weatherproof Decoder Options

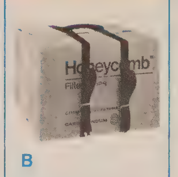
MODEL NO.	DESCRIPTION
SLN-6577A	Autoscan
SLN-6548A	Decoder Service Kit for SLN-6559A
SLN-1120A	Two Input, One Output Video Switch
SLN-6580A	Four Position Accessory Kit
SLN-1112A	Audio Intercom Amplifier
SLN-1114A	PSK Demodulator
SLN-1116A	Coax RF Demodulator
SPN-6109A	Lens Power Supply
SLN-6618A	Installation Kit
SLN-1119A	Weatherproof Relay Unit
SLN-6598A	Relay Expander Kit
SLN-6569A	Decoder Repeater
SLN-6600A	Service Unit for SLN-6540A
TLN-5158A	Service Board for Modules
SLN-6602A	Speaker/Microphone (outdoor)
SLN-6569A	Outdoor Call-In
SLN-6595A	Indoor Speaker/Microphone

High Temperature Equipment

SDN-6242A	Medium Temperature Housing
SDN-6243A	High Temperature Housing with Pyrex Face Plate
SDN-6244A	High Temperature Housing with Pyrex Face Plate & Air Funnel
SDN-6250A	Lenox Lens 60°, 12″ Long
SDN-6255A	Lenox Lens 90°, 24″ Long
SLN-6551A	⅜″ (10mm) f/1.8 Lens with Dichroic Filter
SLN-6552A	½″ (12.5mm) f/1.4 Lens with Dichroic Filter
SLN-6553A	1″ (25mm) f/1.4 Lens with Dichroic Filter
SDN-6299A	Open Porthole System
SDN-6300A	Air Cooled Lens System
61-84307A37	High Temperature Replacement Vicor Glass For HT-10 Housing

Closed Circuit Television Accessories

A



B

Lens Cleaning Kit

A For cleaning those delicate lens. Contains tissue, chamois, and solvent. For removing grease film left by fingerprints etc. Kit also contains hand operated air brush.

RSX-4009A Lens Cleaning Kit

All Purpose Carrier

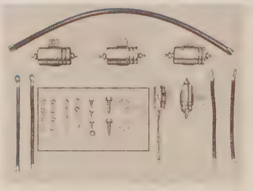
B Can be used to carry cameras, large pieces of test equipment etc. Will hold up to 100 lbs. Handle made of durable black plastic attached to 60 inch braided strap 1 inch wide.

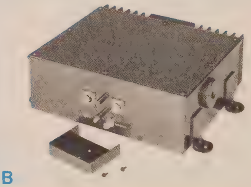
RSX-4010A All Purpose Carrier

Fuses

MODEL NO.	FUSE NUMBER	RATING	TYPE
S-1140, 41, 45	**65-475395**	½ A 125V	MDL 3AG/SLO BLO
S-1170, 71, 72, 73	**65-898635** F1 + F2	¾ A 250V	AGC 3AG
	H.V. F1 **65-802992**	¼ A 125V	3AG MDL
S-1142, 43, 45, 46	**65-21975**	½ A 250V	AGC 3AG
S-1160, 61, 62	**65-21975** (120VAC OPERATION)	½ A 250V	3AG
	65-802992 (220VAC OPERATION)	¼ A 125V	MDL
	65-817955 (24VAC OPERATION)	3 A 125V	SLO BLO
S-1242 9″	**65-136038** USE **65-892099**	¾ A 125V	3AG MDL SLO BLO
S-1252 9″	**65-138269**	.8 A 250V	
S-1269 12″	**65-13859** USE **65-21975**	.5 A 250V	3AG AGC
S-1244 14″	**65-136588**	.8 A 150V	
NEW T14, VP102 14″	**65-138592** F1 + F2 USE **65-21975**	.5 A 250V	
S-1127A	**65-834465**	.4 A 125V	
	65-890033	1½ A 250V	
S-1101	**65-804908**	2 A 125V	
S-1238	**65-475395** F1	.5 A 125V	3AG MDL SLO BLO
	65-892099 F2, F3, F5	.75 A 125V	3AG MDL SLO BLO
	65-834466 F4	1.25 A 125V	3AG MDL SLO BLO
	65-817953 F6	.6 A 125V	3AG MDL SLO BLO
S-1239A	**65-475395** F1 + F3	.5 A 125V	3AG MDL SLO BLO
	65-817953 F2	.6 A 125V	3AG MDL SLO BLO
S-1264-67 ENCODER	**65-475395**	.5 A 125V	
S-1268A	**65-817955** F101	3 A 125V	
	65-817953 F102, F103	.6 A 125V	
	65-804908 F104	2 A 125V	
	65-61688 F105	4 A 250V	
	65-804909 F106, F107	1.6 A 125V	

Noise Reduction Kits and Mobile Power Converters


A TLN-6252A Noise Reduction Kit


B

Mobile Noise Reduction Kits

A These kits are designed to improve the reception of mobile FM two-way radio systems by minimizing noise generated by the vehicles electrical system.

Miscellaneous Alternator Whine Kits

PK-731	For MOCOM•70 negative ground.
PK-734	For MOCOM•70 positive ground.
PK-695	For FACTS Control head.

Alternator Whine Filter Kit

Reduces the alternator whine level heard from U43LLT and U43MSN series MOTRAN radios installed in some vehicles. Installation of the kit can reduce the whine level approximately 10 dB. All necessary parts and instructions are included to make the necessary conversions.

TEN-6068A Alternator Whine Filter Kit

Noise-Reduction Kit

This kit is designed for use in both low and high-band installations. Included in the kit are: lead and lug assemblies, coaxial capacitors, generator field suppressor assembly, ignition coil suppressor cable, mounting hardware. Can be used with either generator or alternator systems.

TLN-6252A Noise-Reduction Kit. For contents see Kit A below.

Noise Reduction Kit

This kit is designed for use in vehicles equipped with two-way radios and alternator electrical systems. Noise reduction is accomplished by proper bonding, filtering with coaxial capacitors, and miscellaneous techniques outlined in the instructions for this kit.

TLN-8845A Noise-Reduction Kit. For contents see Kit B below.

Replacement Parts Listing for TLN-6252A and TLN-8845A

PART NO.	FOR KITS	DESCRIPTION
1-839913	A & B	Lead & Lug Assembly
1-80700A88	A	Lead Assembly
8-82571B02	A & B	Cap., Coaxial (.1 MFD-1000V)
8-82571B01	A	Cap., Coaxial (.5 MFD-100V)
1-80700A89	A	Gen. Field Suppressor Assem.
30-502396	A & B	Ignition Coil Suppressor Cable
1-80700A91	A	Mtg. Hardware Kit
1-80782A52	B	Hood Wipers and Mtg. Hdw. Kit

Transistorized 24 Volt to 12 Volt Converter

B This highly reliable, transistorized 24 to 12 volt converter enables "Motrac" radio, Business "Dispatcher" radio or "T-Power" radio operation from any 24-volt negative ground vehicular primary power source.

Compatible with dash or rear mount radios, the unit is capable of 400 watts (0-30 amps) output. Has a wide variety of mounting options and features an enclosed housing for splash and dust protection.

T-1261B Convertor includes mounting hardware and Universal cable kit

Micor Model Radio Alternator Whine Kits

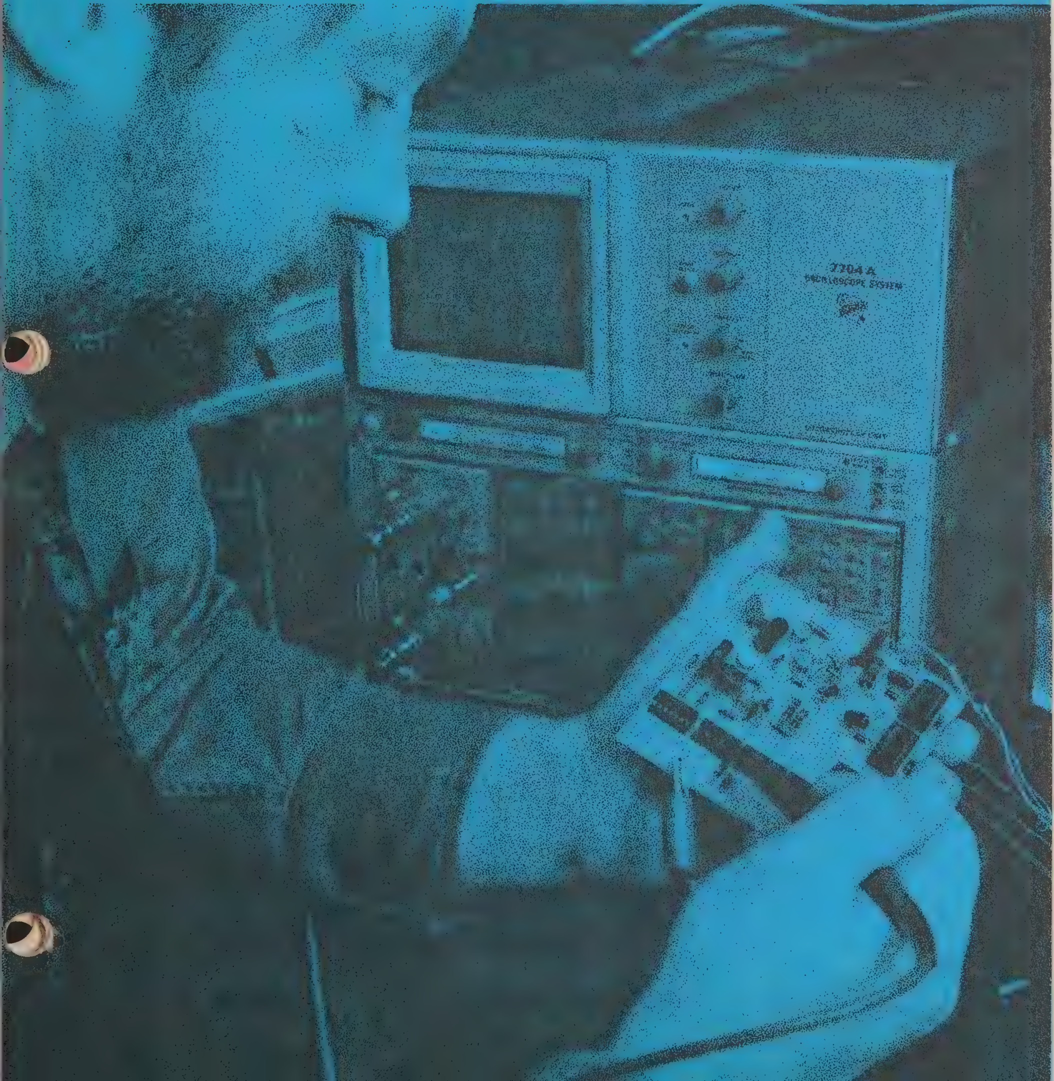
To eliminate or minimize alternator whine on transmitted carrier. Instructions for installation are packed with each kit, (68-81105E02 Inst. sheet).

TLN-5277A	Negative-ground installations
TLN-5278A	Positive-ground installations

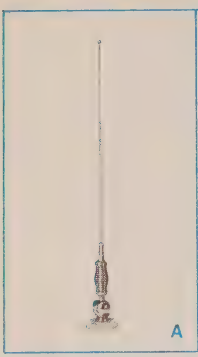
The Parts Department
of the Motorola Communications Group

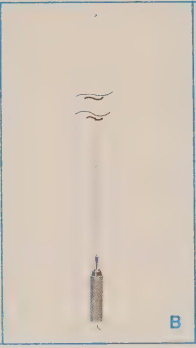
New Product Development

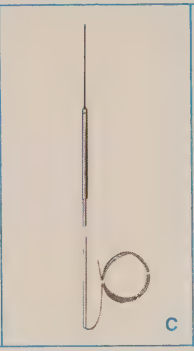
Parts Department engineers are constantly at work developing and improving new types of test equipment and service aids.

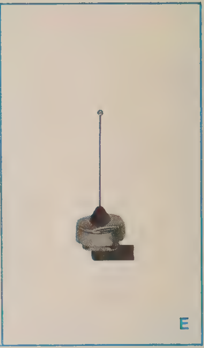

7704 A
OSCILLOSCOPE SYSTEM

Mobile Antennas, Unity Gain









Low Band Swivel Base 25-54 MHz

Exact frequency must be specified.

A Ideal for single and double wall vehicles. Cut installation time in half with this new stainless steel base antenna. It is especially recommended for vehicles with double wall construction. Mounting hardware and RG-58A/U cable included.

Stainless Steel

MODEL NO.	FRE-QUENCY	CABLE LENGTH	
TAB-1001B	25-30 MHz	8 ft.	Standard antenna for low band MICOR and MOCOM 70 radios.
TAB-1002B	30-54 MHz	8 ft.	
TAB-1011B	25-30 MHz	20 ft.	
TAB-1012B	30-54 MHz	20 ft.	

Cadmium Plated

MODEL NO.	FREQUENCY	CABLE LENGTH
TAB-1021B	25-30 MHz	8 ft.
TAB-1022B	30-54 MHz	8 ft.
TAB-1031B	25-30 MHz	20 ft.
TAB-1032B	30-54 MHz	20 ft.

Rooftop Base Loaded 25-50 MHz

Although helpful, exact frequency is not required.

B The mobile rooftop antennas listed below are comprised of a shortened stainless steel whip, chrome plated mounting, a base-loading coil, and RG-58/U coaxial feedline with connector. They may be installed on any flat surface such as a roof or rear deck. Only a single ¾" mounting hole is required, and vehicle headlining need not be disturbed.

Standard Duty (100 Watts Max.)

MODEL NO.	FREQUENCY	CABLE LENGTH
TAB-6061A	25-28 MHz	20 ft.
TAB-6062A	30-36 MHz	20 ft.
TAB-6063A	36-42 MHz	20 ft.
TAB-6064A	42-50 MHz	20 ft.

Heavy Duty (150 Watts Max.)

MODEL NO.	FREQUENCY	CABLE LENGTH
TAB-6071A	25-28 MHz	14 ft.
TAB-6037A	30-36 MHz	14 ft.
TAB-6074A	34-40 MHz	14 ft.
TAB-6075A	40-50 MHz	14 ft.

Coaxial Antennas 132-174 MHz, 450-470 MHz

Although helpful, exact frequency is not required.

C High quality coaxial type antennas which can be mounted on the vehicle bumper or on a flat surface such as a truck cab or body. 450-470 MHz models available in standard or extra length mast for truck installations. Order mounting kits separately.

The 132-174 MHz antennas are of stainless steel construction and are supplied with 15 feet of RG-58/U cable and connector.

The 450-470 MHz antennas are of aluminum construction and are supplied with 10 feet of RG-54A/U cable and connector.

MODEL NO.	FREQUENCY	
TAD-6050A	(132-144 MHz)	
TAD-6041A	(144-150 MHz)	
TAD-6042A	(150-162 MHz)	
TAD-6043A	(162-174 MHz)	
TAE-6010A	(450-470 MHz)	3 Db gain
***TAE-6020A**	(450-470 MHz)	
TLN-6182A	Side mounting kit	
TLN-6414A	Bumper mounting kit	

*Has extra long support mast for mounting on large trucks.

Rooftop Mount 136-174 MHz, 406-470 MHz

Although helpful, exact frequency is not required.

D These rooftop antennas, featuring a greatly improved match, are designed for easy installation. With the new base design, greater effective radiated power and lower standing wave ratio are realized.

The cable and bushing assembly are preassembled at the factory and requires soldering at the connector end only. Supplied with 14 ft. of RG-58A/U cable, connector, adapter and complete instructions.

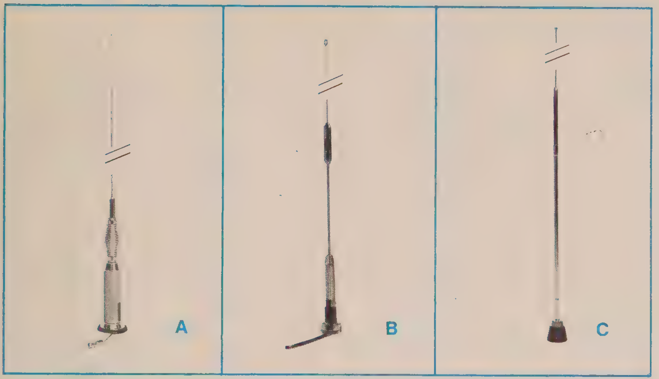
MODEL NO.	FREQUENCY	
TAD-6111A	136-144 MHz	Standard antenna for highband Micor and Mocom radios
TAD-6112A	144-152 MHz	
TAD-6113A	152-162 MHz	
TAD-6114A	162-174 MHz	
TAE-6051A	403-430 MHz	Standard antenna for Mocom and Motrac radios
TAE-6052A	450-470 MHz	
TAE-6053A	430-450 MHz	
TAE-6054B	470-512 MHz	

Rooftop Antenna 806-866 MHz

E This mobile rooftop antenna is supplied with 14 feet of lead-in cable, mounting hardware, and a connector. In completed installations, the cable is concealed between the headlining and the roof of the vehicle, with minimum disturbance to the headlining and upholstery.

MODEL NO.	FREQUENCY
TAF-6041A	806-866 MHz

Mobile Gain Antennas



Gain Antennas and Conversion Kits

A This series of gain antennas and conversion adaptors are of the base loaded transformer type, employing a spring base stainless steel spring and rod.

TAD-6170A antenna is supplied complete with 14 feet of coaxial cable and mounting hardware. The conversion adaptors are supplied with a threaded base to install in existing installations of both older TU-316 series or the latest TAD-6111A, etc. series rooftop antenna. Conversion adaptors are rated at 100 watts max.

TAD-6170A	Gain antenna complete (200 watts max.) (144-174 MHz) (Replaces ST-600)

Rooftop Conversion Adaptors

Consists of stainless rod, loading coil with adapter and spring.

ST-601	144-174 MHz adaptor for TU-316 Series
ST-783	144-174 MHz adaptor for TAD-6110A Series
ST-784	450-470 MHz (5 dB gain) adaptor for TAD-6110A Series
ST-785	Adaptor, "Screw-On" adapts any late TAD-6110A series installation to accept any ASP transformer (ASP #K27)

Rooftop Mount 406-512 MHz High Gain Antenna

Although helpful, exact frequency is not required. Not recommended for trucks or heavy duty.

B These high-gain rooftop antennas provide 3.5 dB omni-directional gain which more than doubles the effective radiated power. It is a collinear-phased array type unit. Available in the 406-420 MHz and 450-470 MHz bands. Each unit is supplied with 14 feet of RG-58A/U cable. Overall antenna rod size is 28 inches for 450-470 MHz and 32 inches for 406-420 MHz models.

TAE-6071A	Antenna (406-420 MHz)
TAE-6072A	Antenna (450-470 MHz)
TAE-6074A	Antenna (470-494 MHz)
TAE-6075A	Antenna (494-512 MHz)

UHF Gain Antenna Conversion Kits

UHF Gain Antenna Conversion kits for standard, VHF and UHF Motorola rooftop antennas provide all of the features of the above TAE-6071A and 6072A antennas. Complete antenna rod assembly with adaptor threaded to match earlier models and current model rooftop antennas. Provides 3.5 dB gain which more than doubles the effective radiated power.

TLE-6111A	Antenna Conversion Kit (406-420 MHz) For TU-265, TU-308 and TU-316 Series Antennas
TLE-6112A	Antenna Conversion Kit (450-470 MHz) For TU-265, TU-308 and TU-316 Series Antennas
TLE-6211A	Antenna Conversion Kit (406-420 MHz) For TAD-6110A and TAE-6050A Series
TLE-6212A	Antenna Conversion Kit (450-470 MHz) For TAD-6110A and TAE-6050A Series

Rooftop Mount High Gain Antennas for Heavy-Duty Applications (406-512 MHz)

Although helpful, exact frequency is not required.

C The TAE-6060B and TAE-6090B series Mobile Rooftop Gain Antenna provides 5 dB gain over the usual quarter-wave rooftops antennas. This amount of gain is equivalent to more than tripling the output power of the transmitter.

The antenna consists of a standard rooftop mount base assembly and a collinear array of two stainless steel elements. The center portion of the radiating section is a phasing coil designed to provide the desired radiation pattern. The antenna has a minimum bandwidth of 7 MHz for a VSWR (Voltage Standing Wave Ratio) of less than 1.5 to 1, and for wider frequency separation up to 13 MHz VSWR is less than 2 to 1. This assures maximum radiation efficiency. The matching section in the base may be adjusted with a small screwdriver or penknife to set operating frequency range.

Mounting base is designed for easy installation. A concealed spring prevents breakage caused by low hanging branches, garage doors or car washes. This antenna can be bent more than 90 degrees with absolutely no damage to the antenna or spring.

In the completed installation, the transmission cable is concealed between the headlining and the roof of the vehicle with a minimum of disturbance to the headlining and upholstery. Supplied complete with 14 feet of RG-58A/U coaxial transmission cable, male UHF connector (PL-259), and installation instructions. Antennas are rated at 100 watts max.

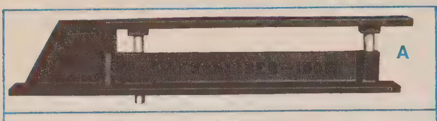
MODEL NO.	FREQUENCY	
TAE-6061B	406-430 MHz	
TAE-6063B	430-450 MHz	
TAE-6062B	450-470 MHz	Standard antenna for UHF MICOR radio
TAE-6064B	470-494 MHz	Use with UHF MOCOM radios
TAE-6065B	494-512 MHz	
TAE-6094B	470-494 MHz	Use with UHF MICOR radios
TAE-6095B	494-512 MHz	

High Gain 450 MHz Conversion Kits

The TLE-6150B series Antenna Conversion Kits fit all new TAD & TAE series Motorola bases, to convert existing high-band and 450 MHz unity gain antennas to high gain 406-512 MHz antennas. Features are the same as TAE-6060B series antenna. Rated at 100 watts max.

MODEL NO.	FREQUENCY
TLE-6151B	406-430 MHz
TLE-6153B	430-450 MHz
TLE-6152B	450-470 MHz
TLE-6154B	470-494 MHz
TLE-6155B	494-512 MHz

Mobile Antennas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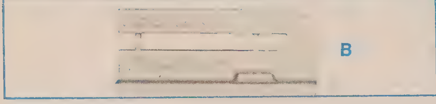
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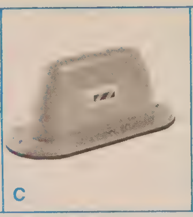
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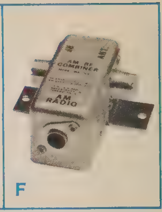


F

Low Profile Mobile Antennas

- **Railroad Engines**
- **Fire Equipment**
- **Highway Vehicles**
- **Transit Vehicles**
- **Riot Vehicles**
- **Heavy Construction Equipment**
- **Industrial Fork Lifts**
- **Industrial Cranes**

The Excaliber

Exact frequency must be specified when ordering.

A & B A rough and ready, low profile antenna that's specifically designed to withstand the toughest treatment. The indestructible EXCALIBER not only outperforms conventional antennas in most cases, but can't be harmed under the adverse conditions that damage ordinary whips. Its vandal-proof solid, cast aluminum construction withstands tremendous punishment and can't be damaged in automatic truck or bus washes.

Government agencies, transit authorities, and railroads find this indestructible antenna the answer for rugged duty, maintenance free communications.

EXCALIBER combines ruggedness with high performance. Since the top of a vehicle is an integral part of the operation of any ¼ wave antenna, the large contact surface on the base of the EXCALIBER reduces resistance to the circulating currents and increases the antenna's efficiency. All EXCALIBER antennas are supplied with female UHF connector less lead-in cable. RG-58/AM coaxial cable recommended.

The Linebacker

Although helpful, exact frequency is not required.

C This new, low-profile special environment communications antenna was evolved from the latest aircraft antenna technology to bring unprecedented reliability and mechanical strength to the professional vehicular field.

Designed especially for railroad, bus, police and fire department applications, the LINEBACKER not only will deliver excellent performance but resist damage or removal where maintenance of communication is critical.

It may be mounted either in vertical or horizontal position. Mounted horizontally, as on a bus roof, maximum radiation is vertically polarized and also omnidirectional. All LINEBACKER antennas are supplied with female UHF connector less lead-in cable. RG-58/AU coaxial cable recommended.

Motorola Model No.	Figure	Frequency Band in MHz	Power Rating in Watts	Band Width in MHz	Termination Impedance	Max. Height Above Mount	Length	Supplier Model No.
TDD-6110A	A	148-174	300	5.0	50	4″	20-33″	EXCALIBER 150F
TDE-6100A	B	450-470	300	20.0	50	2½″	6⁵⁄₁₆″	EXCALIBER 450
ST-1169	C	450-470	100	Over 20.0	50	3⅜″	8″	ASP-572
ST-1170	C	470-488	100	Over 20.0	50	3⅜″	8″	ASPB-572
ST-1171	C	488-512	100	Over 20.0	50	3⅜″	8″	ASPC-572

Disguise Type Antennas

Exact frequency must be specified when ordering.

D These stepped, telescopic antennas are designed to resemble ordinary AM car radio antennas. All antennas are rated at 100 watts and are supplied with 15 ft. of cable and a UHF connector.

TDB-6050A	25-50MHz, 56″ high, unity gain.
TDD-6130A	132-174MHz, 20″ high, ¼ wave, unity gain.
TDD-6140A	132-174MHz, 50″ high, ⅝ wave gain type, 2.5 dB gain.
TDE-6120A	406-470MHz, 20″ high, ⅝ wave gain type, 2.5 dB gain.

Gutter Antenna 130-174 MHz

Although helpful, exact frequency is not required.

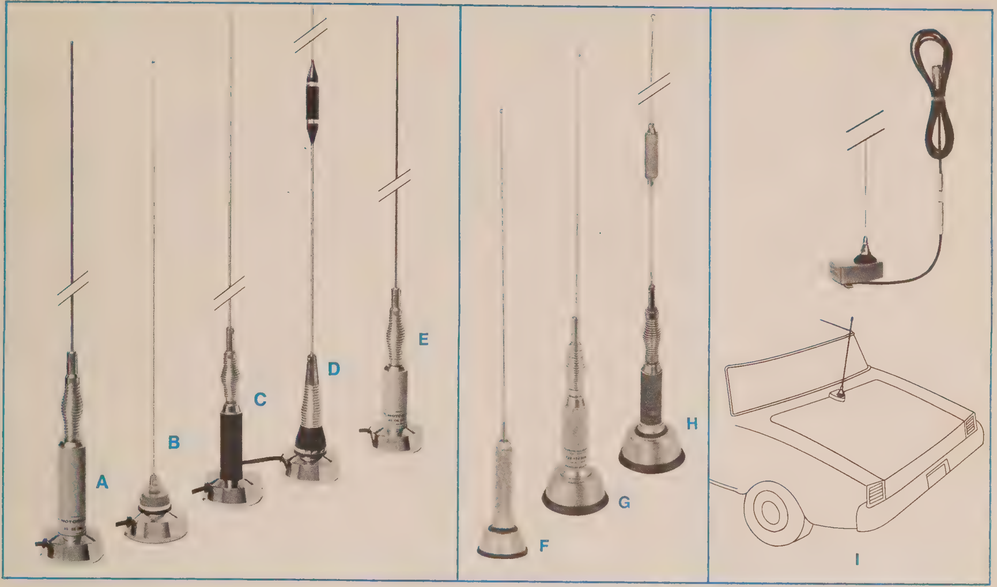
E Designed for use with "Handie-Talkie" or "Pocket Receiver" equipment. Clamps securely to the vehicle rain gutter. Supplied with 10 ft. of RG-58/AU coaxial cable w/plug. Rated at 10 watts maximum.

NDD-6000A	Gutter Antenna.

Antenna Couplers

F These couplers are designed for use with disguised antennas and are provided for connecting your AM broadcast and two-way radio to a single disguised antenna. Units supplied with 4-foot interconnecting cable to broadcast receiver. Power rating is 100 watts. Insertion loss is .25 dB transmitter to antenna and 1.5 dB broadcast to antenna for the TDB-6040A and .2 dB and .5 dB for the TDD-6120A and TDE-6110A.

TDB-6040A	25-50MHz
TDD-6120A	132-174MHz
TDE-6110A	400-470MHz



Magnet Mount Antennas for Temporary Installations

"Grip-Stick" permanent magnet mount antennas are for "no-hole-no-clamp" installation. Ideally suited for use with portable and temporary mobile installations such as used in surveillance work. By having the antenna on the roof of the vehicle this affords maximum performance of your working unit. Adapter kits are available for portable products to connect to these antennas. Maximum power rating: 150 watts unless otherwise specified.

25-50 MHz Unity Gain

A Base-loaded vehicular antennas with 17 ft. RG58/U cable and PL-259 connectors.

TAB-6081A	25-28 MHz antenna
TAB-6083A	30-33 MHz antenna
TAB-6084A	33-36 MHz antenna
TAB-6085A	36-42 MHz antenna
TAB-6086A	42-50 MHz antenna

108-470 MHz Unity Gain

B (ASP-556) unity gain ¼ wavelength antenna includes a 12 ft. RG-58/U cable and a PL-259 connector.

ST-899	108-470 MHz antenna

130-174 MHz 3 dB Gain Antenna

C Same as an ST-600 gain antenna. Includes a 17 ft. RG-58/U cable and a PL-259 connector. Power capability is 100 watts.

ST-900	130-174 MHz antenna

450-470 MHz dB Gain

D Is a gain antenna (5 dB) with a rod phasing coil and includes 17′ of RG-58/U cable and a PL-259 connector.

ST-1186	450-470 MHz antenna

144-174 MHz High Power

E For use on high power mobile radios. 200 watts continuous power rating. Includes 17′ of RG-58 and PL-259 connector.

TAD-6180A	144-174 MHz antenna

No-Hole, Trunk Lid Mount Antennas

Although helpful, exact frequency is not required.

"Quick-Grip," no-hole, trunk lid mount. Installs easily and quickly by means of two small set screws (on underside of trunk lid). May be mounted at top center of trunk or on the side of lid. Similar to magnet mount antennas above.

25-50 MHz Unity Gain

F Low band unity gain antenna features 150 watt power rating.

TAB-6091A	25-27 MHz antenna
TAB-6093A	30-33 MHz antenna
TAB-6094A	33-36 MHz antenna
TAB-6095A	36-42 MHz antenna
TAB-6096A	42-50 MHz antenna

144-174 MHz

G High band antenna features 200 watt power rating.

TAD-6190A	144-174 MHz antenna

450-470 MHz 4 dB Gain

H UHF antenna features 4 dB gain.

ST-970	450-470 MHz antenna

Trunk Lip Mount, Unity Gain

Although helpful, exact frequency is not required.

I Includes heavy duty trunk lip mount, 20″ 17-7 PH stainless steel radiator and 17′ RG-58/U with all connectors attached for easy no holes, no wire trimming installation. Radiating element field tuneable for coverage from 140-500 MHz. Cutting chart included. Unity gain. Shipping weight 1.5 lbs.

ST-1113	Antenna

Motorcycle and Industrial Antennas

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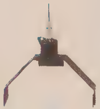
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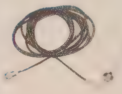
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Motorcycle and Industrial Dispatcher Antennas

Although helpful, exact frequency is not required.

29-50 MHz band—designed for motorcycles and servi-cars.

MODEL NO.	FREQUENCY	VEHICLE
NAB-6121A	37-40 MHz	SERVI-CAR
NAB-6123A	42-45 MHz	SERVI-CAR
NAB-6124A	45-50 MHz	SERVI-CAR

Dayglow Whip Antennas

MODEL NO.	FREQ.	
RRX-4000A	25-29 MHz.	For Solocycles and Industrial Dispatchers
RRX-4001A	30-33 MHz.	
RRX-4002A	33-36 MHz.	
RRX-4003A	36-42 MHz.	
RRX-4004A	42-50 MHz.	

The NAD-6031B and NAD-6032B Antennas can-be mounted on the trunk compartment cover of Servi-Cars or on the dust covers of over rear fender mounted radios on Solocycles. The NAD-6041A and NAD-6042A Antennas are for Solocycle rear mounting.

MODEL NO.	FIG.	FREQUENCY
NAD-6031B	A	144-162 MHz
NAD-6032B		162-174 MHz
NAD-6041A	B	144-162 MHz
NAD-6042A		162-174 MHz

Motorcycle Antennas

Although helpful, exact frequency is not required.

Supplied with 4 ft. of RG-58/U cable and PL-259 UHF connector.

MODEL NO.	FREQUENCY	FIG.	GAIN
TAD-6212A	146-152 MHz	C	Unity
TAD-6213A	153-162 MHz		Unity
TAD-6214A	163-174 MHz		Unity
TAE-6122A	450-470 MHz	D	Unity
NLN-6850A	Bracket for Saddlebag Antenna Mount for above antennas.		

UHF 5db Gain Antenna

The TAE-6082A Gain Antenna is a colinear arrangement of two ⅝ wavelength radiating sections. Properly phased for maximum gain, and impedance matched to a 50 ohm system, it is designed for Motorcycle use and industrial applications, in the 450-470 MHz range. Supplied with 4 ft. of RG-58/u cable and PL-259 UHF connector.

TAE-6082B Motorcycle Gain Antenna

Low Power Industrial Antennas

Although helpful, exact frequency is not required.

Recommended for installations of a temporary nature and for industrial installations in vehicles not normally exposed to adverse weather conditions. Rated for a maximum power of 12 watts RF. Low band antennas available with or without loading coil and right angle plug. (All terminated in UHF, PL-259 connector.)

132-174 MHz Antennas

FIG.	FREQ. RANGE	ANTENNA W/RT. ANGLE CONNECTOR	ANTENNA ONLY
E	132-150.8 MHz	**NAD-6130A**	**NAD-6181A**
E	150.8-162 MHz	**NAD-6131A**	**NAD-6182A**
E	162-174 MHz	**NAD-6132A**	**NAD-6183A**

25-54 MHz Antennas

FIG.	ANTENNA WITH LOADING COIL & RT. ANGLE CON-NECTOR	ANTENNA WITH LOADING COIL	LOADING COIL ONLY	FREQ. RANGE
F	—	**NAB-6141A**	**1-80732A34**	25-30 MHz
F	**NAB-6202A**	**NAB-6142A**	**1-80732A35**	30-36 MHz
F	**NAB-6203A**	**NAB-6143A**	**1-80732A36**	36-42 MHz
F	**NAB-6204A**	**NAB-6144A**	**1-80732A37**	42-48 MHz
F	**NAB-6205A**	**NAB-6145A**	**1-80732A38**	48-54 MHz

47-483170 25-54 MHz Antenna Rod Only For All Frequencies

25-54 MHz Collapsible Antenna

G A telescopic antenna for replacement of the whip type antenna normally supplied with both "H" and "P" series models operating in the 25-54 MHz range. Extendable to a full quarterwave length for optimum radiation characteristics, the antenna collapses to approximately 1′ in height for storage.

NAB-6090A (was NU-133) Collapsible Antenna (For "H" and "P" series)

Antenna Mounting Accessories

Antenna Mounting Bracket Kit

Required for the NAB-6121A through NAB-6124A Antennas. For fiberglass body Servi-Cars 1967 and later.

NLN-6631A

Antenna Mounting Bracket Kit

Used to mount a whip antenna and associated loading coil over the rear fender of a Harley-Davidson Solocycles and Industrial Dispatcher equipment.

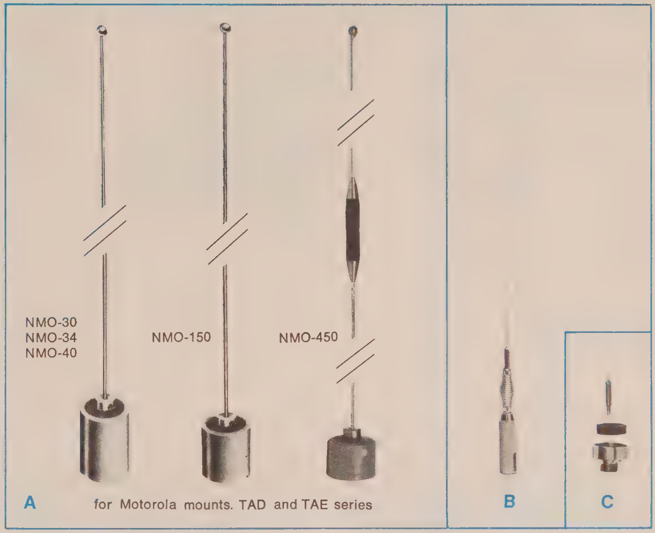
NLN-6636A

Antenna Mounting Bracket

Required with all 30-50 MHz and NAD-6210B antennas for Solocycle rear fender or saddlebag installations.

NLN-6637A

Mobile Antenna Conversion Kits



Conversion Kits for TAD-6110A Series Antennas

A These are low silhouette antennas designed for minimum wind drag in roof-top installations. Loading coils are hi-impact epoxy construction for long life and require no tuning. Rods are made of stainless steel for flexibility and silver plated for low radiation resistance. An SWR of 1.5-1 at 30-50 MHz and 1.3-1 at 144-174 MHz or 450-470 MHz can be realized with careful trimming of the antenna rods. Comes complete with Allen wrench, cutting chart, and measuring rule. Power rating is 100 watts.

Note that the ST-847 and the ST-848 provide an overlap of frequencies from 34-36 MHz. In this band it is recommended that you order the ST-848 as this antenna will provide the longest radiating whip when cut for minimum VSWR.

MODEL NO.	COLOR	FREQ.	GAIN
ST-847	Yellow	30-36MHz	Unity
ST-848	Blue	34-40MHz	Unity
ST-849	Red	40-50MHz	Unity
ST-850	—	144-174MHz	—
ST-1094	—	450-470MHz	5 dB

ST-961 Ant. Mtg. Kit used with ST-847 and ST-850 and ST-1094 Conv. Ant. Kits). Includes 14 ft. RG-58/AU coaxial cable and UHF male connector (PL-259).

Conversion Adaptors

Although helpful, exact frequency is not required.

B Consists of stainless rod with adapter (loading coil and spring on 144-174 and 450-470 MHz models.)

ST-601	144-174 MHz For TU-316 Series
ST-779	25-28 MHz For TAD-6110A Series
ST-780	30-36 MHz For TAD-6110A Series
ST-781	36-42 MHz For TAD-6110A Series
ST-782	42-50 MHz For TAD-6110A Series
ST-783	144-174 MHz For TAD-6110A Series
ST-784	450-470 MHz For TAD-6110A Series

UHF Gain Antenna Conversion Kits

UHF Gain Antenna Conversion kits for standard, VHF and UHF Motorola roof-top antennas provide all of the features of TAE-6071A and 6072A antennas. Complete antenna rod assembly with adaptor threaded to match earlier models and current model roof-top antennas. Provides 3.5 dB gain which more than doubles the effective radiated power.

TLE-6111A	Antenna Rod Kit (406-420 MHz) For TU-265, TU-308 and TU-316 Series
TLE-6112A	Antenna Rod Kit (450-470 MHz) For TU-265, TU-308 and TU-316 Series
TLE-6211A	Antenna Rod Kit (406-420 MHz) For TAD-6110A and TAE-6050A Series
TLE-6212A	Antenna Rod Kit (450-470 MHz) For TAD-6110A and TAE-6050A Series
TLE-6152A	Ant. Conv. Kit 5 db Gain (450-470 MHz)

"Screw-On" Adaptors

C Adaptor, "Screw-On" adapts any late TAD-6110A series installation to accept any ASP transformer

ST-785 Adapter

Mobile and Base Antenna Cross Reference Chart

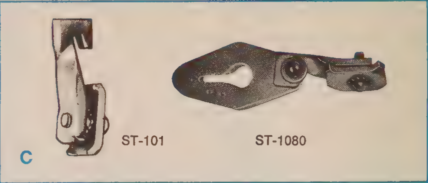
MFGR. NO.	Mot. No.	MFGR. NO.	Mot. No.	MFGR. NO.	Mot. No.	MFGR. NO.	Mot. No.
(1) ASP-544	TAB-6093A	(1) ASP-800	TAD-6170A	(6) P.D. 206-509	TDC-6011A	(6) P.D. 455-509 & 568-509	TDE-6051A
(1) ASPA-544	TAB-6095A	(1) ASP-802	TAD-6190A	(6) P.D. 220-509	TDD-6071A	(6) P.D. 455-509 & 568-509	TDE-6052A
(1) ASPC-544	TAB-6091A	(1) APS-804	TAD-6180A	(6) P.D. 220-509	TDD-6072A	(6) P.D. 455-509 & 568-509	TDE-6056A
(1) ASP-555	TAB-6083A	(3) CV2455	TAE-6020A	(6) P.D. 220-509	TDD-6073A	(6) P.D. 455-509 & 568-509	TDE-6057A
(1) ASPA-555	TAB-6085A	(3) P942	TDF-6020	(6) P.D. 220-509	TDD-6074A	(6) P.D. 455-509 & 568-509	TDE-6058A
(1) ASPB-555	TAB-6086A	(3) P948G	TDF-6030	(6) P.D. 220-509	TDD-6075A	(6) P.D. 455-509 & 568-509	TDE-6059A
(1) ASPC-555	TAB-6081A	(3) P972	TDF-6040	(6) P.D. 220-509	TDD-6090A	(6) P.D. 201-509	TDE-6081A
(1) ASP-732	TAB-6093A	(3) P9120	TDF-6050	(6) P.D. 220-509 & 555-509	TDD-6081A	(6) P.D. 201-509	TDE-6082A
(1) ASPA-732	TAB-6094A	(5) Mirage "L"	TDB-6050A	(6) P.D. 220-509 & 555-509	TDD-6082A	(6) P.D. 201-509	TDE-6084A
(1) ASPB-732	TAB-6095A	(5) Mirage "HA"	TDD-6130A	(6) P.D. 220-509 & 555-509	TDD-6083A	(6) P.D. 201-509	TDE-6085A
(1) ASPC-732	TAB-6096A	(5) Mirage "HC"	TDD-6140A	(6) P.D. 220-509 & 555-509	TDD-6084A	(6) P.D. 201-509	TDE-6086A
(1) ASPD-732	TAB-6091A	(5) Mirage 402	TDE-6120A	(6) P.D. 220-509 & 555-509	TDD-6085A	(6) P.D. 201-509	TDE-6087A
(1) ASPA-734	TAB-6084A	(5) Excaliber 150F	TDD-6110A	(6) P.D. 220-509 & 555-509	TDD-6100A	(6) P.D. 201-509	TDE-6088A
(1) ASP-734	TAB-6083A	(6) P.D. 377-509	TLE-6211A	(6) P.D. 455-509	TDE-6041A	(6) P.D. 201-509	TDE-6089A
(1) ASPB-734	TAB-6085A	(6) P.D. 377-509	TLE-6212A	(6) P.D. 455-509	TDE-6042A	(6) P.D. 688-509	TDE-6090A
(1) ASPC-734	TAB-6086A	(6) P.D. 379-509	TLE-6111A	(6) P.D. 455-509	TDE-6046A	(6) P.D. 688-509	TDE-6091A
(1) ASPD-734	TAB-6081A	(6) P.D. 379-509	TLE-6112A	(6) P.D. 455-509	TDE-6047A	(6) P.D. 688-509	TDE-6092A
		(6) P.D. 206-509	TDB-6031A	(6) P.D. 455-509	TDE-6048A	(6) P.D. 399-509	TDE-6010A
		(6) P.D. 206-509	TDB-6032A	(6) P.D. 455-509	TDE-6049A		

(1) Antenna Specialists (3) Mark Products (5) Sinclair (6) Phelps Dodge

Accessories

A

B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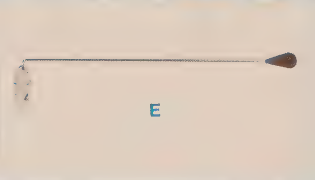
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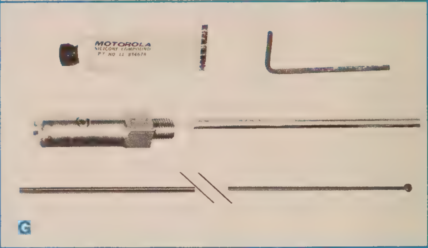
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Antenna Hole Cutting Tool

A Speed up antenna installations with this time-saving, easy-to use tool. The antenna hole cutting tool is screwed on a sleeve around a ¼″ drill bit. Once the ¼″ pilot hole is made, the hole cutting tool takes over to carve out a clean antenna hole. The tool bites only through the thickness of the metal being drilled. It can go no further, thus there is no danger of drilling through headliner fabric or material. While the hole is being cut, the tool also removes a fine line of paint from the metal around the circumference of the hole to provide a good ground for antenna installation. This tool is designed for use with hand drills or ⅜″ or larger low-speed power drills. High cutting speeds will burn and dull the cutting edges. Cutting edges may be resharpened when necessary. Kit includes mandrel with ¼″ drill bit, Allen wrench, ¾″ hole cutter for high-band antenna installations and 1 5/16″ hole cutter for low-band antenna installations.

Note: Not recommended for use with double roof vehicles.

ST-157	Antenna Hole Cutting Tool
ST-158	1 5/16″ Replacement Cutter
ST-159	¾″ Replacement Cutter

Roof Top Antenna Replacement Assortment Kits

B Three Kits—one for electrical components, one for mechanical and electrical parts for the new TAD-6110A series, etc. antennas. Kits provide a wide variety of parts to service 144-174 MHz and 406 MHz roof top antennas. Kits include a generous supply of insulators, eyelets, bushings, ferrules, gaskets, hole plugs, etc. Use for TU-265, 308, 316, 360, NAD-6030B series, P-8553B and TAD-6110A, etc. series antennas. Each kit is packaged in a sturdy "see thru" plastic box with identification of parts by MOTOROLA number and description.

PDK-110	Electrical components antenna replacement Kit for TU-316 series, etc.
PDK-111	Mechanical components antenna replacement Kit for TU-316 series, etc.
PDK-114	Mechanical and Electrical antenna replacement Kit for TAD-6110A, etc. series antennas

Gutter-Mounted Whip Clips

C Handy clips for quick-action fastening down of long whips during inoperative periods. Attach with single screw to gutter; no holes in vehicle. Choice of styles.

ST-101	Hold-down Clip, uninsulated
ST-1080	Hold-down Clip, insulated

Whip Length Tester

D Triple chrome plated, 3 section 96″ tube assembly mounted on marked stainless steel base adapter. Used for testing proper whip length before cutting to frequency in 30 to 50 MHz band.

ST-599	Whip Length Tester

Instrument Antennas

E Terminated in male BNC connector, these instrument antennas can be used with any deviation or frequency meter.

SAN-6000A	Antenna 8″ long
TEKA-24A	Antenna 17″ long

Antenna Hole Plugs

F A wide variety of sizes to seal holes in vehicles after removing antennas.

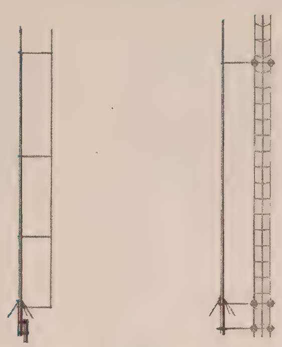
5-803001	Rubber plug—to seal hole left by roof top antennas. 1½″ covering diameter for ¾″ hole
38-854230	Rubber plug—to seal hole left by spring base antennas. 3¾″ covering diameter for 1 5/16″ hole
38-83042H73	Rubber plug—to seal hole left by rooftop antennas. 1¼″ covering for ⅜″ hole
38-83042H74	Rubber plug—to seal hole left by rooftop antennas. 1½″ covering diameter for ⅞″ hole

Antenna Rod Kit

G Replacement antenna rod for 25-54 MHz mobile antennas such as the P-7253, TU-304 and TU-305 series spring mount antennas, or any other antenna assembly utilizing a Motorola spring mount (part No. 51-85936). Kit consists of 96″ length of stainless steel antenna rod, one antenna bushing, #10 Allen wrench and silicone grease.

SK-9433	Ant. Rod Kit
47-840613	Antenna Rod only
43-844171	Bushing, antenna
3-3861	Set screws for 43-844171 bushing

Base Station Antennas



A

B

Gain Antennas 136-174 MHz

Although helpful, exact frequency is not required.

A The TDD-6070A, 80A, 90A and 100A series antennas are factory cut to a specific length for the operating frequency band. Field adjustment is not required. The antennas are enclosed in a fiberglass radome which provides physical support for the antenna as well as an insulating cover. The encapsulation provides a high degree of protection from precipitation and dust particle static.

Improved performance can be achieved in some communication systems by using a directional pattern antenna.

Antennas are supplied with Model TDN-6017B mounting clamps for top mounting. All antennas have UHF connectors unless otherwise specified.

FREQUENCY MHz	OMNI MODEL	GAIN
136-143	TDD-6071A	4.8 DB
142-151	TDD-6072A	4.8 DB
150-159	TDD-6073A	5.25 DB
*150-159	TDD-6090A	5.25 DB
157-166	TDD-6074A	5.25 DB
165-174	TDD-6075A	5.25 DB

FREQUENCY MHz	WITH REFLECTOR MODEL	GAIN
136-143	TDD-6081A	6.3 DB
142-151	TDD-6082A	6.3 DB
150-159	TDD-6083A	6.75 DB
*150-159	TDD-6100A	6.75 DB
157-166	TDD-6084A	6.75 DB
165-174	TDD-6085A	6.75 DB

*These antennas have "N" connectors

Side-Mount Kit includes all the necessary hardware required for side mounting of the above antennas to towers having a 18"-24" face. The kit will fit round tower members up to 1-5/16" diameter but also will fit larger members with larger U-bolts (not supplied).

TDN-6056A

The TDN-6017B is a top mounting kit *included* with the above antennas.

TDN-6017B

SPECIFICATIONS

Power Rating: 500 watts R-F input. **VSWR:** Less than 1.5 to 1. **Impedance:** Nominal 50 ohm. **Termination:** UHF or type "N"*. **Lightning Protection:** DC ground. **Survival Wind Load:** 125 MPH. **Maximum Height:** 22 feet. **Net Weight:** 23 lbs. average (less direction offset and side-mount kit).

Lightweight Gain Antennas

Although helpful, exact frequency is not required.

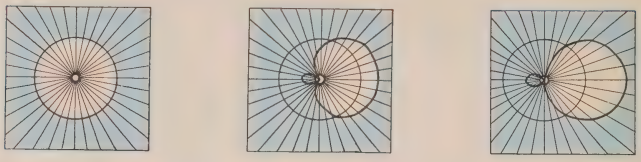
B TDD-6021, 22, 23 & 24A series are smaller in size and lighter in weight, engineered to provide 2.8 db gain across their respective frequency ranges. These antennas exhibit wide band characteristics, as much as 12 MHz in the 150-174 MHz range.

MODEL†	TDD-6021A†	TDD-6022A†	TDD-6023A†	TDD-6024A†
FREQUENCY	136-141 MHz	141-150 MHz	150-162 MHz	162-174 MHz
TERMINATION	UHF Female			
WIND RATING WITH ½" RADIAL ICE	70 mph	70 mph	80 mph	80 mph
WIND RATING WITHOUT ICE	90 mph	90 mph	100 mph	100 mph
HALF-POWER ANGLE	34°			
BANDWIDTH (% OF CENTER FREQUENCY)	3.6	6.2	7.7	7.2
GAIN OVER HALF-WAVE DIPOLE	2.8 db across frequency band			
NET WEIGHT	8 lbs.			
SHIPPING WEIGHT	10 lbs.			
OVERALL LENGTH	120 in.	113 in.	107 in.	98 in.
MOUNTING	To 1-2⅜ in. O.D. pipe			

†Includes mounting clamp kit.

Base Station Antennas

HORIZONTAL RADIATION PATTERNS



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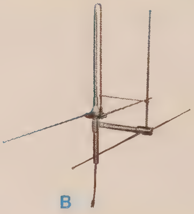
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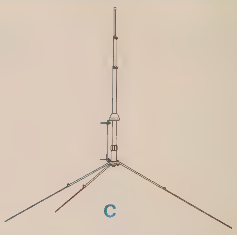

C

Two antenna types serve the coverage requirements of base station users in the 25-54 and 66-88 MHz frequency range. Each antenna model offers 500 watt RF output capability, a voltage standing wave ratio less than 1.5:1 to reduce reflected power loss, built-in protection to minimize lightning damage, and rugged construction utilizing corrossion resistant materials for a long, maintenance-free life.

Three (3) basic patterns are offered: omni-directional, cardioid and uni-directional yagi.

An OMNI-DIRECTIONAL provides equal coverage 360° around the antenna.

A CARDIOID or heart shaped pattern results in extended coverage over 180° by distorting the omni-directional pattern.

A UNI-DIRECTIONAL pattern results when the antenna elements concentrate the signal in one general direction.

"Slim-Profile" Antenna 25-50 and 66-88 MHz

Exact frequency must be specified when ordering.

A This lightweight, easy to install antenna provides the mechanical strength and durability inherent with high-grade fiberglass. In addition, the fiberglass construction affords that much needed protection from charged particle noise (precipitation static) which is so prevalent in this frequency band. The antenna also has a D. C. ground for maximum protection against lightning damage. The "Slim-Profile" antenna provides a vertically polarized, omni-directional pattern and is capable of being used for permanent or temporary base stations with RF power output of up to 500 watts. Here is a truly versatile antenna, ideal for 25-50 and 66-88 MHz base station users.

TDB-6071A	25-30 MHz antenna
TDB-6072A	30-35 MHz antenna
TDB-6073A	35-42 MHz antenna
TDB-6074A	42-50 MHz antenna
TDC-6020A	66-88 MHz antenna

Antennas include mounting kit TDN-6075A.

SPECIFICATIONS

Impedance: 50 ohms. **Maximum Power:** 500 watts. **Maximum VSWR:** 1.5:1. **Height:** From 105″ to 230″ depending on freq. **Mounting:** 1″-3½″ O.D. pipe. **Wind Rating:** 100 mph with ½″ ice. 125 mph without ice. **Termination:** UHF female. **Net Weight:** Approx. 10 lbs.

Cardioid Antenna 25-54 and 66-88 MHz

Exact frequency must be specified when ordering.

B The cardioid antenna suits applications where extended directional coverage through 180° is desired. Parasitic element provides 3 db forward gain in the direction of maximum signal strength. The grounded radiating element provides a static charge drain path for optimum signal-to-noise ratio as well as for lightning protection. Wind rating (without ice) is 100 MPH except for TDC-6011A which is 125 MPH.

TDB-6031A	25-30 MHz antenna
TDB-6032A	30-54 MHz antenna
TDC-6071A	66-88 MHz antenna

Antennas include mounting kits.

SPECIFICATIONS

Impedance: 50 ohms (nominal). **Gain Over Monopole:** 3 db in forward direction. **Maximum VSWR:** 1.5:1. **Height:** From 50″ to 129″ depending on freq. **Mounting:** For 1″ to 2¾″ O.D. pipe. **Half Power Angle:** 180°. **Front to Back Ratio:** 20 dB. **Termination:** Pigtail UHF female. **Bandwidth:** ±.05%.

Omni-Directional Antenna 25-50 MHz

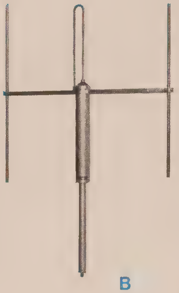
Although helpful, exact frequency is not required.

C Field adjustable to cover any frequency from 25-50 MHz. Element and radial length vs frequency chart included. Radiator length at lowest frequency: 113″. Radials: 114½″. Nominal impedance 50 ohms. Commercial power rated at 500 watts continuous duty. DC grounding included.

Mounts on vertical pipe from 1⅝″ O.D. to 2¼″ O.D. "U" bolt separation, 11″. Heavy duty 3⁄16″ aluminum frame includes high impact polystyrene insulator and SO-239 coax connector. All elements seamless aluminum. Vertical element telescoping from 1⅛″ to ⅞″ tubing. Radials ½″ to ⅜″ dia. Shipping weight: 10¾ lbs.

ST-1112 (New Tronics BBQ-2550)

A



B

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Omni-Directional Antennas 136-174 MHz

Although helpful, exact frequency is not required.

A Radiation pattern over full 360° for normal coverage applications. Basic half-wave center fed design provides low radiation angle and increased radiating aperture which gives up to 1.5 db gain over typical quarter-wave "ground plane" antennas.

The Omni-Directional series Unity Gain Antennas use a vertically polarized coaxial dipole configuration, which provides an omni-directional radiation pattern. A unique grounded element minimizes received signal degradation caused by precipitation static and other forms of electrostatic discharges.

Mast coupling and pattern distortion has been minimized through careful design of the coaxial skirt section. A low-loss, broadband matching transformer is mounted in the support staff to maintain less than 1.5 vswr (voltage standing wave ratio) over the frequency specified.

These antennas are terminated in a UHF connector which will accept a PL259 or equivalent plug.

TAD-1001B	136-141 MHz antenna
TAD-1002B	141-150 MHz antenna
TAD-1003B	150-162 MHz antenna
TAD-1004B	162-174 MHz antenna

Antennas include mounting kit TLN-6685A.

SPECIFICATIONS

Impedance: 50 ohms (nominal). **Maximum Power:** 500 watts. **Maximum VSWR:** 1.5:1. **Maximum Height:** 56 in. **Mounting:** To 1⅝″-3½″ O.D. pipe. **Maximum Lateral Thrust with 100 mph Wind and ½″ Radial Ice:** 32 lbs. **Net Weight:** 6 lbs.

Uni-Directional 150-174 MHz

Although helpful, exact frequency is not required.

B Yagi design provides uni-directional pattern for point-to-point and selected area coverage use. Radiation concentrated in forward direction with minimum forward gain of 5.8 db over other folded coaxial dipole antennas.

A low loss broad band matching transformer is mounted in the support staff to maintain less than 1.5 VSWR (voltage standing wave ratio) over the range specified.

These antennas are supplied terminated in a UHF connector which will accept a PL259 or equivalent plug.

TAD-1021B	150-156 MHz antenna
TAD-1022B	156-162 MHz antenna
TAD-1023B	162-168 MHz antenna
TAD-1024B	168-174 MHz antenna

Antennas include mounting kit TLN-6685A.

SPECIFICATIONS

Impedance: 50 ohms (nominal). **Maximum Power:** 500 watts. **Maximum VSWR:** 1.5:1. **Half-Power Angle:** 85°. **Front-to-Back Ratio:** 10 dB. **Gain Over Half-Wave Dipole:** 5.8 dB in forward direction. **Maximum Height:** 56 in. **Mounting:** To 1⅝″-3½″ O.D. pipe. **Maximum Lateral Thrust with 100 mph Wind and ½″ Radial Ice:** 75 lbs. **Net Weight:** 7½ lbs.

Cardioid 141-174 MHz

Although helpful, exact frequency is not required.

C Extended coverage over 180° angle with minimum gain of 3 db in direction of maximum signal strength. Ideal for special coverage applications, particularly base stations on shorelines or geographical borders.

The Cardioid Antennas and Uni-Directional Antennas use a vertically polarized coaxial dipole and reflector configuration, which provides a directional radiation pattern. Maximum signal is achieved in one direction decreasing to unity gain (relative to ½ wave dipole) at 90° either side of maximum signal. For the Cardioid antenna the beam width of the Uni-Directional antennas is 45° either side of maximum signal strength.

A unique grounded element minimizes received signal degradation caused by precipitation static and other forms of electrostatic discharges.

Cardioid antennas provide 3 db gain over ½ wave "dipole" antennas, and as much as 4.5 db gain over typical "ground-plane" antennas.

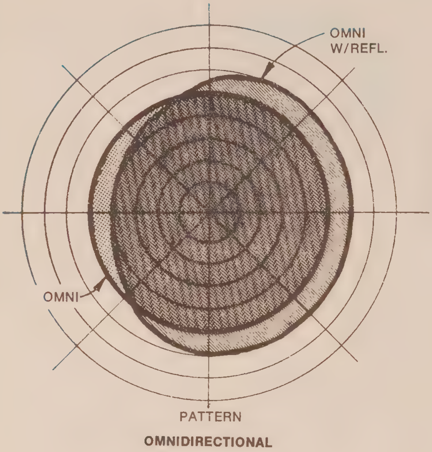
TAD-1012B	141-150 MHz antenna
TAD-1013B	150-162 MHz antenna
TAD-1014B	162-174 MHz antenna

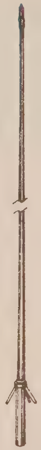
Antennas include mounting kit TLN-6685A.

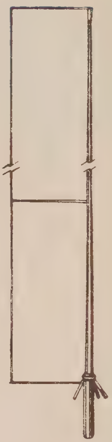
SPECIFICATIONS

Impedance: 50 ohms (nominal). **Maximum Power:** 500 watts. **Maximum VSWR:** 1.5:1. **Half-Power Angle:** 180°. **Front-to-Back Ratio:** 10 dB. **Gain Over Half-Wave Dipole:** 3 dB in forward direction. **Maximum Height:** 56 in. **Mounting:** To 1⅝″-3½″ O.D. pipe. **Maximum Lateral Thrust with 100 mph Wind and ½″ Radial Ice:** 55 lbs. **Net Weight:** 7 lbs.

Base Station Antennas







406-420,
450-512 MHz

Exact frequency must be specified when ordering.

Collinear Arrays A complete line of omnidirectional and slightly directional (with reflector) antennas for general base station use.

- **5.0, 7.5, and 9.2 dBd Omnidirectional Gain**
- **9.0 and 10.7 dBd Gain with Reflector**
- **10 MHz Bandwidth**
- **Top Mount or Optional Side Mount**

Corner Reflector For directional radiation and point-to-point communications.

- **9.0 dBd Gain**
- **25.0 dB Front-To-Back Ratio**
- **20 MHz Bandwidth**

Yagi Array A lightweight, low cost, highly directional base station antenna.

- **10.0 dBd Gain**
- **15.0 dB Front-To-Back Ratio**
- **20 MHz Bandwidth**

Because of the critical tuning characteristics of the Yagi Array, it is NOT RECOMMENDED for use in areas where ice and snow accumulation is probable.

These High Gain Antennas will meet all base station coverage requirements in 406-420 MHz and 450-512 MHz frequency bands. All antennas feature type "N" connectors to reduce reflected power losses. Built-in lighting protection is standard. Sturdy, lightweight construction assures dependable operation, even in high winds and under icing conditions.

Side Mount Kits

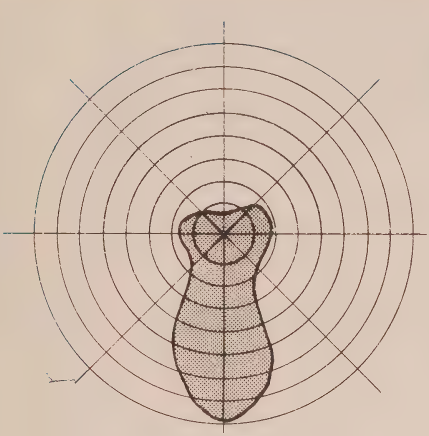
MODEL NUMBER	USED WITH	SPACING FROM TOWER
TDN-6056A	TDE-6040A and 6050A	6 in. to 36 in. Adjustable
TDN-6073A	TDE-6060A, -70A and -80A	6 in. to 36 in. Adjustable

Transmission Line

MODEL NUMBER	TYPE	MAX. RECOMMENDED LENGTH
TDN-6065A	½″ FOAM	70 FEET
TDN-6066A	⅞″ FOAM	130 FEET
TDN-6067A	⅞″ AIR	200 FEET

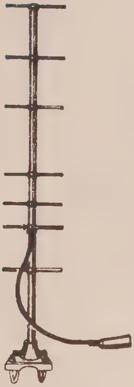
Gain Vrs. Frequency Chart

GAIN	406-420 MHz	450-460 MHz	460-470 MHz	470-482 MHz	482-494 MHz	494-506 MHz	500-512 MHz
5.0 dBd		TDE-6081A	TDE-6082A	TDE-6086A	TDE-6087A	TDE-6088A	TDE-6089A
7.5 dBd	TDE-6063A (7 dBd)	TDE-6061A	TDE-6062A	TDE-6066A	TDE-6067A	TDE-6068A	TDE-6069A
9.0 dBd		TDE-6071A	TDE-6072A	TDE-6076A	TDE-6077A	TDE-6078A	TDE-6079A
		(450-476 MHz) TDE-6030B		(476-512 MHz) TDE-6031A			
9.2 dBd		TDE-6041A	TDE-6042A	TDE-6046A	TDE-6047A	TDE-6048A	TDE-6049A
10.0 dBd		(450-470 MHz) TDE-6090A		(470-494 MHz) TDE-6091A		(494-512 MHz) TDE-6092A	
10.7 dBd		TDE-6051A	TDE-6052A	TDE-6056A	TDE-6057A	TDE-6058A	TDE-6059A



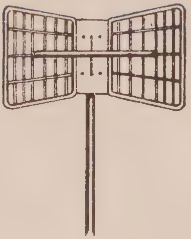
PATTERN

CORNER REFLECTOR



TDE-6090A

YAGI ARRAY



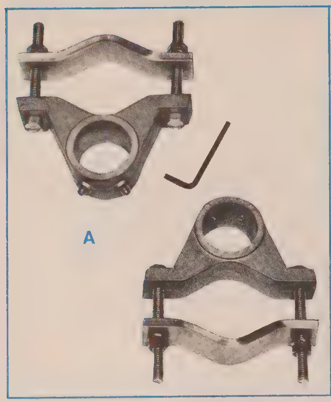
TDE-6030B

GENERAL SPECIFICATIONS (RATED PER EIA STANDARD RS-329)

	COLLINEAR ARRAYS					**DIRECTIONAL**	
	MODEL SERIES TDE-6080A	**MODEL SERIES TDE-6060A**	**MODEL SERIES TDE-6070A**	**MODEL SERIES TDE-6040A***	**MODEL SERIES TDE-6050A***	**MODEL SERIES TDE-6030B**	**MODEL SERIES TDE-6090A**
ANTENNA MODEL NUMBER	**TDE-6081A TDE-6082A TDE-6086A TDE-6087A TDE-6088A TDE-6089A**	**TDE-6061A TDE-6062A TDE-6063A TDE-6066A TDE-6067A TDE-6068A TDE-6069A**	**TDE-6071A TDE-6072A TDE-6076A TDE-6077A TDE-6078A TDE-6079A**	**TDE-6041A TDE-6042A TDE-6046A TDE-6047A TDE-6048A TDE-6049A**	**TDE-6051A TDE-6052A TDE-6056A TDE-6057A TDE-6058A TDE-6059A**	**TDE-6030B TDE-6031B**	**TDE-6090A TDE-6091A TDE-6092A**
DESCRIPTION	**OMNI-DIRECTIONAL**	**OMNI-DIRECTIONAL**	**WITH REFLECTOR**	**OMNI-DIRECTIONAL**	**WITH REFLECTOR**	**CORNER REFLECTOR**	**YAGI ARRAY**
GAIN (dBd)	5.0	7.5 (7.0 at 406-420)	9.0	9.2 (9.5 IMTS)	10.7	9.0	10.0
LENGTH (FEET)	8	15	15	22	22	2′x4′	14″x52″
NET WEIGHT (LBS.)	3.5	21	24	25	34	19	5
SHIPPING WEIGHT (LBS.)	15	40	45	65	75	24	10
MAXIMUM CONTINUOUS POWER (WATTS)	150	250	250	250	250	500	250
MATERIAL **SUPPORT PIPE**	6061-T6 ALUMINUM	GALVANIZED STEEL		6061-T6 ALUMINUM		GALVANIZED STEEL	6061-T6 ALUMINUM
RADOME	FIBERGLASS					N.A.	N.A.
MOUNTING	MOUNTING CLAMP KIT INCLUDED FOR TOP-MOUNTING TO A 1″-2¾″ O.D. PIPE					UP TO 3.0″ O.D. PIPE	1.5″-2.5″ O.D. PIPE

*THIS ANTENNA IS NOT RECOMMENDED IN HIGH WIND AREAS BECAUSE OF ITS NARROW BEAM WIDTH.

Base Station Antenna Accessories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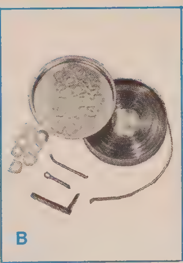
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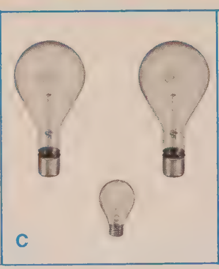
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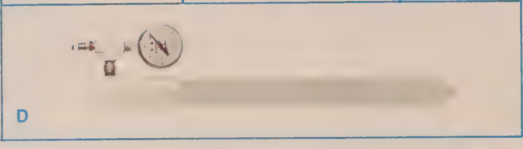
E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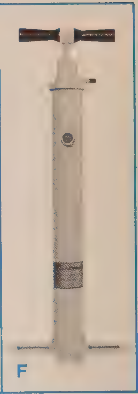

F

Antenna Mounting Clamp Kits

A The TLN-6685A Antenna Mounting Kit may be used for mounting any lightweight antenna having a 1″ to 3½″ O.D. support staff.

The kit is made of aluminum alloy with stainless steel hardware to prevent rust and corrosion. "Allen" head set-screws secure the antenna mast in the mounting kit sleeve. Two clamps hold the kit to a mounting surface. Stainless steel bolts, nuts and lockwashers are used to mount the clamps.

Extremely versatile, it can be mounted to a pipe, angle iron, flat on wall or to flat channel members of a tower.

TLN-6685A Antenna Mounting Kit

KIT NO.	APPLICATION
K-8269	TU-309 and TU-310 Series Ant to 2½″ O.D. pipe
TDN-6017B	For TDB-6030, TDC-6060, TDD-6010, -6070, -6080, -6090, -6100, TDE-6040, -6050, -6080 series Ant. to 1″ to 2¾″ pipe.
TDN-6020A	For TDD-6020A series Ant. to 1⅔″ pipe.
TDN-6071A	For TDF-6020, 30, 40, 50 2″ to 3½″ pipe
TDN-6074A	For TDE-6060, 70 Series 1¼″ to 3″ pipe
TDN-6075A	For TDB-6070A series and TDC-6020A Ant. to 1″ to 3½″ pipe.
TLN-6685A	For TAD-1000, -1010, -1020 series Ant. to 1″ to 3½″ pipe.
Side Mount Kits	
TDN-6056A	For TDD-6070, -6080, -6090, -6100, TDE-6040, -6050 series Ant. 6″-36″ adjustable spacing from tower.
TDN-6073A	For TDE-6060, -6070, -6080 series Ant. 6″-36″ adjustable spacing from tower.

Wraplock

B Contains 100 ft. of stainless steel banding, a quantity of connectors and a ratchet tool. Used to strap antenna masts to pipes, towers, poles, etc. Packaged in a dispenser type can for fast installation.

42-823572

Tower Bulbs

C Towers and other high obstructions that are not lighted due to a bulb burnout are hazards to aircraft navigation. Keep a supply of spare bulbs in your shop and vehicles and help prevent accidents.

6000 Hr. and 3000 Hr., 620 Watt Bulbs

These MoGul Pre-focus lamps are used in beacon lighting systems for obstructions to navigation such as TV, radio, microwave and transmission line towers, bridges, water tanks, stacks and other tall structures as specified by the FAA and FCC.

65-866713	3000 hr., 620W-120V Mogul Pre-Focus
65-84258C75	6000 hr., 620W-130V Mogul Pre-Focus

6000 Hr. 116 Watt Bulb

This is a 6000 hr., 120V, 116 watt screw base lamp used in obstruction lighting and meets FAA and FCC tower lighting requirements.

65-84258C74 6000 hr., 116W-120V Screw Base

Gauge and Valve Assembly

D The ST-945 gauge and valve assembly is used in most air filled coaxial lines. Kit includes a 0-30 lb. gauge, ⅛″ female "Tee" pressure valve and cap, also a 4″ extension tube assembly. This is used when the space for a gauge is limited. One end of the extension tube has a male ⅛″ fitting. The opposite end has a ⅛″ female fitting.

ST-945

Leak Tec Foam

E A scientifically developed neutral fluid for detecting high or low pressure leaks quickly, with absolute safety. When applied to a suspected leak area, the fluid reacts immediately to even the most minute leak by forming a white bubble foam at the leak source.

11-82326A01 Leak Tec, 6 oz. bottle

Miscellaneous Accessories

F Dry air pump. Delivers air having 50 to 60 degrees F dew point differential depending on intake conditions. Supplied with 1 lb. of silica gel crystals and 8 ft. of hose.

ST-935 (Andrew 878A)

MOTOROLA INC.

instruction manual revision

GENERAL

This revision outlines changes that have occurred since the printing of your instruction manual. Use this information to correct your manual.

INSTRUCTION MANUALS AFFECTED:

68P81037E75-B	MITREK Two-Way FM Radio 403-420 MHz and 450-512 MHz, 30/50 W
68P81045E65-O	MITREK Two-Way FM Radio 29.7-50 MHz 60/110 W
68P81045E70-O	MITREK Two-Way FM Radio 136-174 MHz 40/60/75/110 W
68P81045E75-O	MITREK Two-Way FM Radio 406-420 MHz and 450-512 MHz, 30/50/75/100 W
68P81045E80-O	MITREK Two-Way FM Radio 806-870 MHz 12/35 W

REVISION DETAILS:

Please add the attached revised page to your instruction manual:

Instruction Section 68P81039E23-E, DIGITAL PRIVATE-LINE Encoder/Decoder, Model HLN4011A, replaces Instruction Section 68P81039E23-C/D.

CROSS-REFERENCE LIST: Old vs New Resistor Part Numbers (Cont'd.)

Ohms (1/4 Watt)	Old Part Number Carbon Composition 10%	Old Part Number Carbon Composition 5%	New Part No. Carbon Film 5%
1.1k		6-124A50	6-11009C50
1.2k	6-124C51	6-124A51	6-11009C51
1.3k		6-124A52	6-11009C52
1.5k	6-124C53	6-124A53	6-11009C53
1.6k		6-124A54	6-11009C54
1.8k	6-124C55	6-124A55	6-11009C55
2.0k		6-124A56	6-11009C56
2.2k	6-124C57	6-124A57	6-11009C57
2.4k		6-124A58	6-11009C58
2.7k	6-124C59	6-124A59	6-11009C59
3.0k		6-124A60	6-11009C60
3.3k	6-124C61	6-124A61	6-11009C61
3.6k		6-124A62	6-11009C62
3.9k	6-124C63	6-124A63	6-11009C63
4.3k		6-124A64	6-11009C64
4.7k	6-124C65	6-124E65	6-11009C65
5.1k		6-124A66	6-11009C66
5.6k	6-124C67	6-124A67	6-11009C67
6.2k		6-124A68	6-11009C68
6.8k	6-124C69	6-124A69	6-11009C69
7.5k		6-124A70	6-11009C70
8.2k	6-124C71	6-124A71	6-11009C71
9.1k		6-124A72	6-11009C72
10k	6-124C73	6-124A73	6-11009C73
11k		6-124A74	6-11009C74
12k	6-124C75	6-124A75	6-11009C75
13k		6-124A76	6-11009C76
15k	6-124C77	6-124A77	6-11009C77
16k		6-124A78	6-11009C78
18k	6-124C79	6-124A79	6-11009C79
20k		6-124A80	6-11009C80
22k	6-124C81	6-124A81	6-11009C81
24k		6-124A82	6-11009C82
27k	6-124C83	6-124A83	6-11009C83
30k		6-124A84	6-11009C84
33k	6-124C85	6-124A85	6-11009C85
36k		6-124A86	6-11009C86
39k	6-124C87	6-124A87	6-11009C87
43k		6-124A88	6-11009C88
47k	6-124C89	6-124A89	6-11009C89
51k		6-124A90	6-11009C90
56k	6-124C91	6-124A91	6-11009C91
62k		6-124A92	6-11009C92
68k	6-124C93	6-124A93	6-11009C93
75k		6-124A94	6-11009C94
82k	6-124C95	6-124A95	6-11009C95
91k		6-124A96	6-11009C96
100k	6-124C97	6-124A97	6-11009C97
110k		6-124A98	6-11009C98

CROSS-REFERENCE LIST: Old vs New Resistor Part Numbers (Cont'd.)

Ohms (1/4 Watt)	Old Part Number Carbon Composition 10%	Old Part Number Carbon Composition 5%	New Part No. Carbon Film 5%
120k	6-124C99	6-124A99	6-11009C99
130k		6-124B01	6-11009D01
150k	6-124D02	6-124B02	6-11009D02
160k		6-124B03	6-11009D03
180k	6-124D04	6-124B04	6-11009D04
200k		6-124B05	6-11009D05
220k	6-124D06	6-124B06	6-11009D06
240k		6-124B07	6-11009D07
270k	6-124D08	6-124B08	6-11009D08
300k		6-124B09	6-11009D09
330k	6-124D10	6-124B10	6-11009D10
360k		6-124B11	6-11009D11
390k	6-124D12	6-124B12	6-11009D12
430k		6-124B13	6-11009D13
470k	6-124D14	6-124B14	6-11009D14
510k		6-124B15	6-11009D15
560k	6-124D16	6-124B16	6-11009D16
620k		6-124B17	6-11009D17
680k	6-124D18	6-124B18	6-11009D18
750k		6-124B19	6-11009D19
820k	6-124D20	6-124B20	6-11009D20
910k		6-124B21	6-11009D21
1 meg	6-124D22	6-124B22	6-11009D22

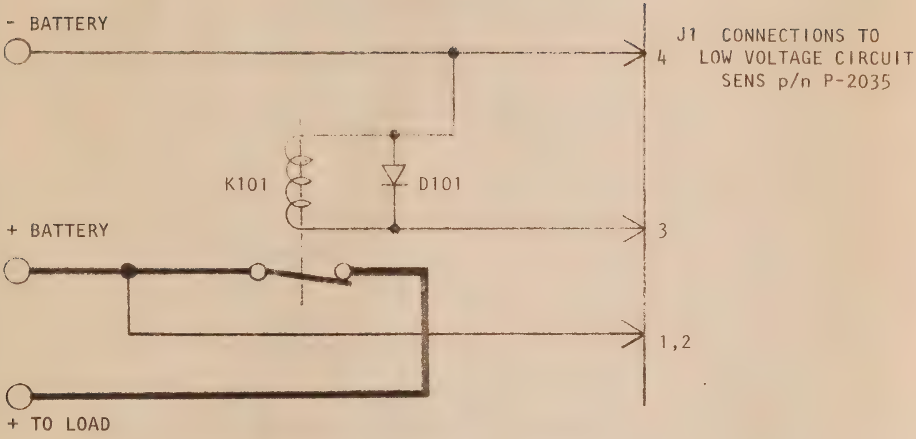
LDP - 12 - 50
SENS S/N 940-03
thru 940-28

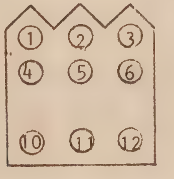
LOW DC VOLTAGE LOAD DISCONNECT CIRCUIT

To provide low-voltage load disconnect, the battery voltage is divided to approximately 3.2 volts by resistors R2 - R5. This voltage is compared to a temperature-compensated reference obtained from diodes D2 - D6. When the battery voltage is low (below 10.4 volts), the non-inverting input of IC1 is lower than the inverting input. This causes the output to go low. After a 60-second delay introduced by C1 and R7, the non-inverting input of IC2 goes low, turning off Q1. This permits relay K1 to return to its unactuated position, opening the load disconnect solenoid.

Hysteresis generated by positive feedback through R6 Maintains the load disconnect relay in an "open" condition until battery voltage reaches a point high enough(12.3 volts)to indicate operation of the charger.

At this point diode D8 charges C1 rapidly and the load is reconnected without further delay.


- BATTERY
+ BATTERY
+ TO LOAD
K101
D101
J1 CONNECTIONS TO LOW VOLTAGE CIRCUIT SENS p/n P-2035
4
3
1,2

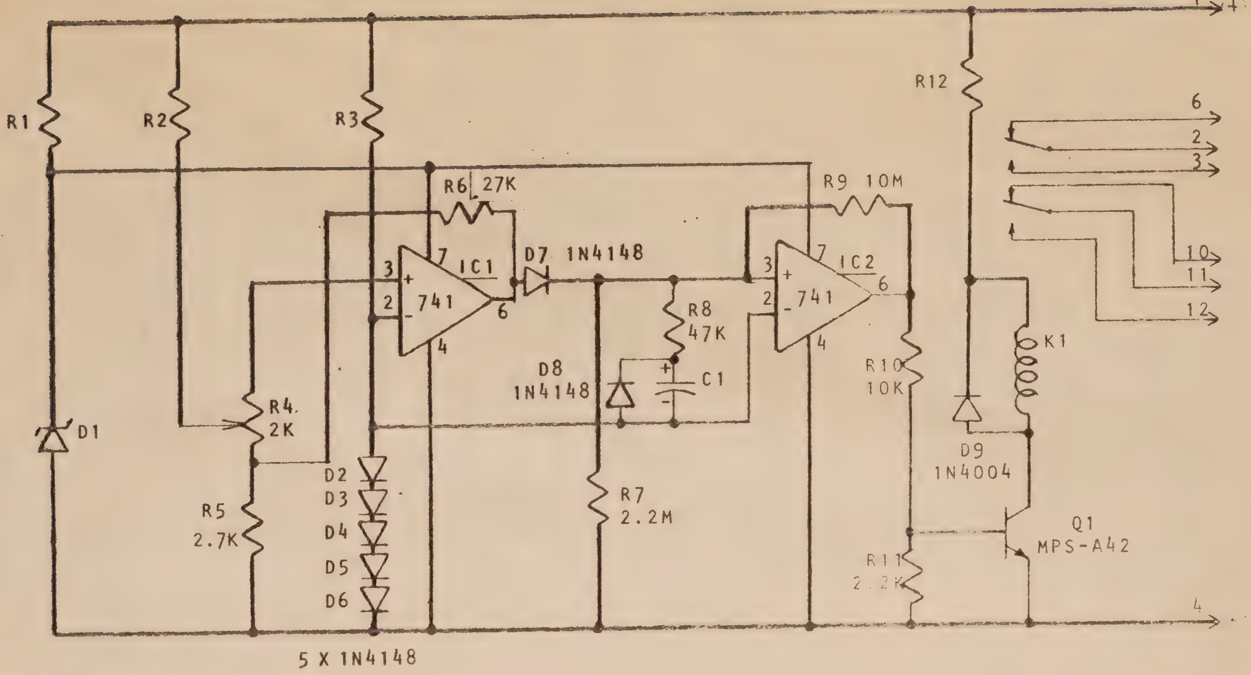


J1 CONNECTOR VIEWED
FROM COMPONENT
SIDE OF BOARD

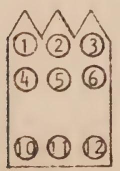
LDP - 12 - 50

LOAD DISCONNECT PANEL

DWG. A1 - 241



1 +
R1
R2
R3
R12
6
2
3
R6 27K
R9 10M
D7 1N4148
3
2
7
IC1
741
6
4
3
2
7
IC2
741
6
4
10
11
12
R8
47K
K1
D8
1N4148
C1
R4
2K
D1
R10
10K
D9
1N4004
D2
D3
D4
D5
D6
R5
2.7K
R7
2.2M
Q1
MPS-A42
R11
2.2K
4
5 X 1N4148



CONNECTOR VIEWED
FROM COMPONENT
SIDE OF BOARD

12 VOLT LOAD DISCONNECT PCB

P-2035

DWG. A1 - 243

NOTE: FOR COMPONENT VALUES NOT SHOWN, REFER TO PARTS LIST A6-210

REF	DESCRIPTION
	CAPACITORS
C1	15 WVDC Tantalum Kemet K-series For standard 60-second delay: 22MFD For 180-second delay: 68MFD For -second delay: MFD
	DIODES
D1	Zener, 9.1v; SENS p/n P-3155 (escept 12v units) Zener, IN5252 (12v units only)
D2 THRU D8	IN4148, GE
D9	IN4004 Motorola or equal
	INTEGRATED CIRCUITS
IC1 & IC2	Type 741 Op-amp Signetics or equal
	RELAYS
K1	DPDT:American Zettler AZ-420-1011-4L
	RESISTORS
R1	470 5% ¼W carbon film
R2	6.8K 5% ¼W carbon film
R3	2.2K 5% ¼W carbon film
R4	2K Potentiometer Helipot 72PR2K
R5	2.7K 5% ¼W carbon film
R6	27K 5% ¼W carbon film
R7	2.2M 5% ¼W carbon film
R8	47K 5% ¼W carbon film
R9	10M 10% ¼W carbon comp.
R10	10K 5% ¼W carbon film
R11	2.2K 5% ¼W carbon film
R12	
	TRANSISTORS
Q1	Motorola MPS-A42
	VOLTAGE RANGE 8-12 volts
	AS PER SCHEMATIC A1-243

PARTS LIST

LOAD DISCONNECT PBC

SENS P/N P-2035

DWG. A6-210

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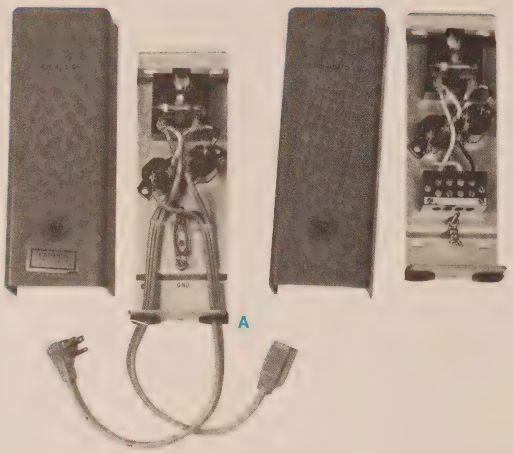
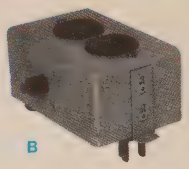
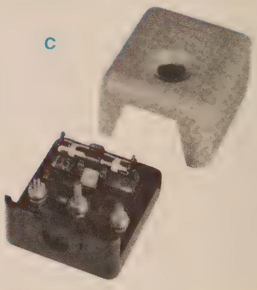
Surge Protectors







Power Line Surge Protectors

- **Automatic Operation**
- **Self-Restoring**
- **Uses Quick Operating 3-Electrode Heavy Duty Gas Tube Surge Arrester**
- **Completely Self-Contained**
- **Easy Installation**

A The RRX-4017A, RRX-4018A, and RRX-4020A provide overvoltage protection for AC powered equipment. Model RRX-4017A has a screw terminal connector block for direct power wiring and model RRX-4018A has standard 3-prong plug and receptacle on 18-inch cables. Both the RRX-4017A and the RRX-4018A are designed for 117 VAC, 10 Amp single phase circuits. Model RRX-4020A is similar to RRX-4017A but is designed for 220/240 VAC, 30 Amp circuits. An added feature of this model is that it can also be used to simultaneously protect two 117 VAC, 15 Amp lines.

RRX-4017A	Power line surge protector with screw terminal wiring block for 117 VAC, 10 Amp line.
RRX-4018A	Similar to RRX-4017A but with standard 3-prong plug and receptacle in place of screw terminal wiring block.
RRX-4020A	Similar to RRX-4017A but designed for 220/240 VAC, 30 Amp circuits.

Plug-in Power Line Surge Protector

- **Automatic Operation**
- **Self-Restoring**
- **Uses Quick Operating 3-Electrode Heavy Duty Gas Tube Surge Arrester**
- **Completely Self-Contained**
- **Rapid, Easy Installation**
- **Pilot Light "On" Indicates Normal Status**

B The RRX-4019A protects radio equipment from lightning damage, other electrical system disturbances, or sustained surges. It is designed for use on standard 117 VAC, 15 Amp single phase duplex convenience receptacles.

RRX-4019A	Plug-in Power Line Surge Protector

Telephone Line Surge Protector

- **Heavy Duty 3-Electrode Gas Tube Surge Arrester**
- **Fail-safe Link**
- **Separate Binding Terminals for Tip, Ring, and Ground**
- **Long Life and Low Maintenance**
- **Easy Installation in both New and Existing Applications**
- **Tamper Resistant Design**

C The RRX-4021B provides fail-safe lightning protection for phone lines between remote control units and radio base stations. Striking voltage range of gas tube surge arrester is 300-500 VDC; typical lifetime in excess of 10,000 surges at a 500 Ampere peak. The integral encapsulated fail-short, air gap, gas tube module eliminates moisture problems.

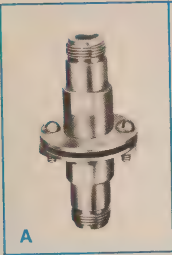
RRX-4021B	Telephone line surge protector.
80-80330A71	Replacement gas tube assembly.

Replacement Parts for Surge Protector

65-80332A56 Fail-safe Spacer for RRX-4021A telephone line surge arrester. *(Note: not used on newer "B" version).*

3-Electrode Gas Tube Surge Arresters

PART NUMBER	STRIKING VOLTAGE	USED ON
80-80333A26	150-300 VDC	110 VAC Protectors, RRX-4017A and RRX-4018A
80-80332A55	300-500 VDC	Telephone Line Protector RRX-4021A
80-80330A71	300-500 VDC	Telephone Line Protector RRX-4021B
80-80333A27	500-900 VDC	220/240 VAC Protector RRX-4020A
80-80333A25	150-300 VDC	Plug-in Power Line Protector RRX-4019A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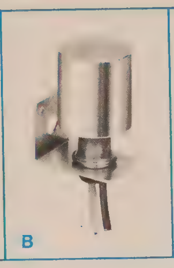
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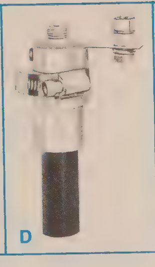
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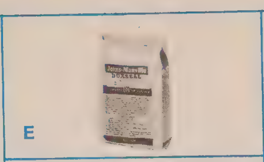

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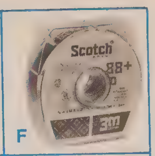

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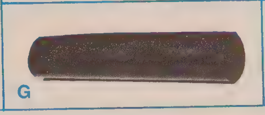
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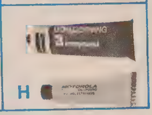


H

Lightning Protection . . .

Make sure your base station is fully protected

Lightning Arrestors

A Lightning arrestors minimize lightning risk to costly two-way equipment such as receiver front ends and transmitter final amplifiers and harmonic filters. When inserted at a critical point in an antenna system, these easily installed lightning arrestors will provide added protection to your equipment and personnel.

ST-786	"UHF" type (Phelps Dodge 593-509)
ST-787	"N" type (Phelps Dodge 595-509)

AC Line Surge Protector

B The TLN-4399A ac line surge protector is recommended in areas where lightning, static discharge, or other line surges are encountered. The unit features a hermetically sealed, pre-ionized spark gap and will bypass repeated overvoltages without significant change in breakdown level or insulation resistance. Typical breakdown voltage is 1500V when subjected to a voltage rising at 10kv/sec. Units will withstand repeated current surges of 10 kiloamperes for 200 microseconds. Weatherproof construction permits mounting indoors or outdoors in a standard ½-14 conduit hole or using the mounting bracket supplied. Unit connects directly across the 117 VAC line.

TLN-4399A	Surge Protector

Control Line Protector

C The 80-83029H02 and 80-3029H04 discharge gap (sealed-in gas type) surge protectors are designed for connection to the control lines used with base station equipment. Units have a discharge voltage of 230V dc and 350V dc respectively and can withstand 5 kiloampere peaks of 120 microseconds duration. Miniature construction permits unit to be mounted easily on line terminals. Two are required for each pair of lines and connect from each line to ground.

80-83029H02	Control Line Spark Gap, 230V dc
80-83029H04	Control Line Spark Gap, 350V dc

Grounding Clamp Kits

D Grounding clamp kits are a necessity on two-way communications installations where there may be a risk to equipment or personnel from shock or lightning. The clamps are made to fasten to ½″ or ⅞″ heliax cable, and to pipe or grounding rod. The installation for jacketed cable is the same as for unjacketed cable except that the cable clamp is fastened to a cable connector rather than to the body of the cable. Clamps are constructed of stainless steel. PK-382 cable (conductor size #6) suggested for grounding.

PK-382	Grounding Cable 100-ft. box 30-825602 cond. size No. 6.
ST-788	For ½″ jacketed heliax and pipe or grounding rod. (Phelps Dodge 477-509)
ST-853	Same as above except for ⅞″ jacketed heliax.
ST-789	For ½″ unjacketed heliax includes brass bushings for better electrical contact without collapsing line (Phelps Dodge 575-509)
ST-790	Same as above except for ⅞″ unjacketed reliax. (Phelps Dodge 576-509)

Sealer

E Model ST-193 Duxseal is an all-purpose, weatherproof, corrosion-resistant, sealing compound for indoor-outdoor caulking of conduit runs, antenna lead-ins, journal boxes, and any other application where a weatherproof seal is required.

ST-193	Duxseal 1 lb. pkg.

Tape

F Model ST-453 Plastic Cold-Weather Electrical Tape has a vinyl backing which will not crack or split, and which will remain flexible and easy to use even at below freezing temperatures. Upon application it forms a tight, weatherproof seal. It is supplied in 66 ft. rolls in easy-to-use plastic dispensers. ¾ in. wide.

ST-453	Plastic tape with dispenser

Shrink Tubing for Weatherproofing Coaxial Lines

G Two sizes of Shrink tubing are available for weatherproofing coaxial lines and joints. One size has a diameter of 1.1″ and is designed for ½″ heliax and RG 8/U coaxial lines; the other has a diameter of 1.5″ and is ideal for ⅞″ heliax coaxial lines. Both are supplied in pieces 6″ long. The tubing is slipped over the part of the cable to be weatherproofed, and heat is applied to shrink the tubing.

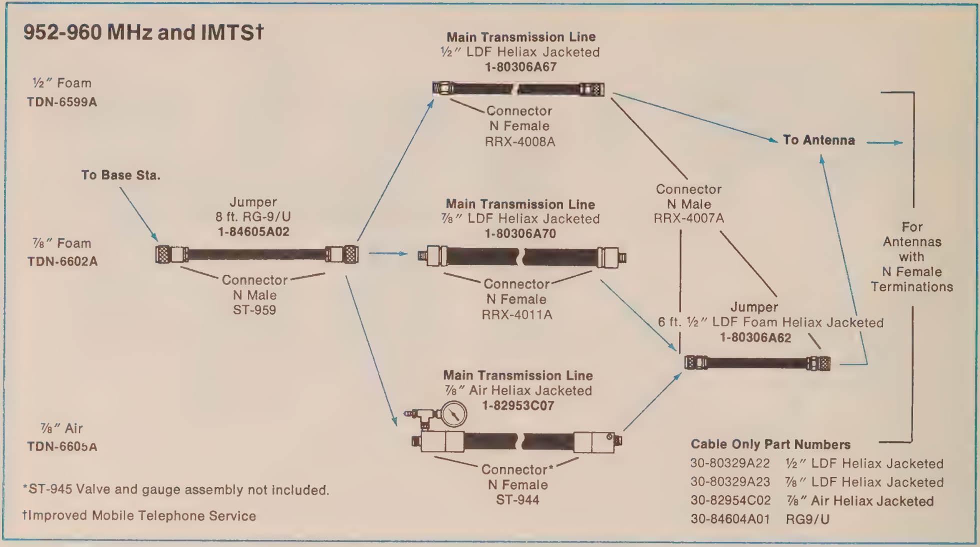
11-84306A21	½″ Heliax Shrink Tubing
11-84306A22	⅞″ Heliax Shrink Tubing

Lubricants

H 11-834678 Silicone Grease. For type N and UHF fittings. Apply grease to fittings before joining to fill voids so that no moisture can collect. Prevents drop in efficiency of electrical insulation and resulting transmission losses.

11-834678	¼ oz. tube
11-490487	8 oz. tube

Jacketed Heliax Transmission Line Kits


952-960 MHz and IMTS†
½″ Foam
TDN-6599A
⅞″ Foam
TDN-6602A
⅞″ Air
TDN-6605A
To Base Sta.
Jumper
8 ft. RG-9/U
1-84605A02
Connector
N Male
ST-959
Main Transmission Line
½″ LDF Heliax Jacketed
1-80306A67
Connector
N Female
RRX-4008A
Main Transmission Line
⅞″ LDF Heliax Jacketed
1-80306A70
Connector
N Female
RRX-4011A
Main Transmission Line
⅞″ Air Heliax Jacketed
1-82953C07
Connector*
N Female
ST-944
To Antenna
Connector
N Male
RRX-4007A
Jumper
6 ft. ½″ LDF Foam Heliax Jacketed
1-80306A62
For
Antennas
with
N Female
Terminations

Cable Only Part Numbers

30-80329A22	½″ LDF Heliax Jacketed
30-80329A23	⅞″ LDF Heliax Jacketed
30-82954C02	⅞″ Air Heliax Jacketed
30-84604A01	RG9/U

*ST-945 Valve and gauge assembly not included.

†Improved Mobile Telephone Service

Supplied in Complete Installation Kits

Jacketed Foam Heliax Transmission Line is provided in two sizes, ½″ and ⅞″, as part of complete line kits. Kits are available for use with antennas with UHF Female terminations, or for antennas with N Male terminations.

Low Loss

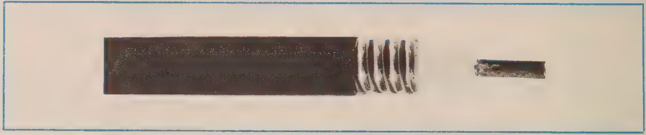
Both foam heliax and air heliax use high conductivity copper for the center conductor and the outer jacket. Low-loss foam polyethylene is used as a dielectric or insulating material. The new LDF series cables have a low density foam dielectric. The result is less attenuation through ohmic and dielectric losses.

Corrosion Resistance

Jacketing and Copper, one of the most corrosion resistant of the common metals, are used for Motorola transmission lines because of their superior weathering characteristics.

Flexibility

Because of its jacketed and corrugated construction it can be curved around building configurations, tower elements and other obstructions and can be pulled through conduits. Since it is flexible it can be taken down and moved to a new location if necessary.



Recommended Maximum Cable Lengths

CABLE TYPE	25-54 MHz	66-88 MHz	136-174 MHz	406-470 MHz	952-960 MHz
½″ LDF Heliax	360′	240′	200′	90′	70′
⅞″ LDF Heliax	620′	460′	310′	170′	100′
⅞″ Air Heliax	720′	500′	370′	200′	120′

Attenuation per 100 Feet in dB.

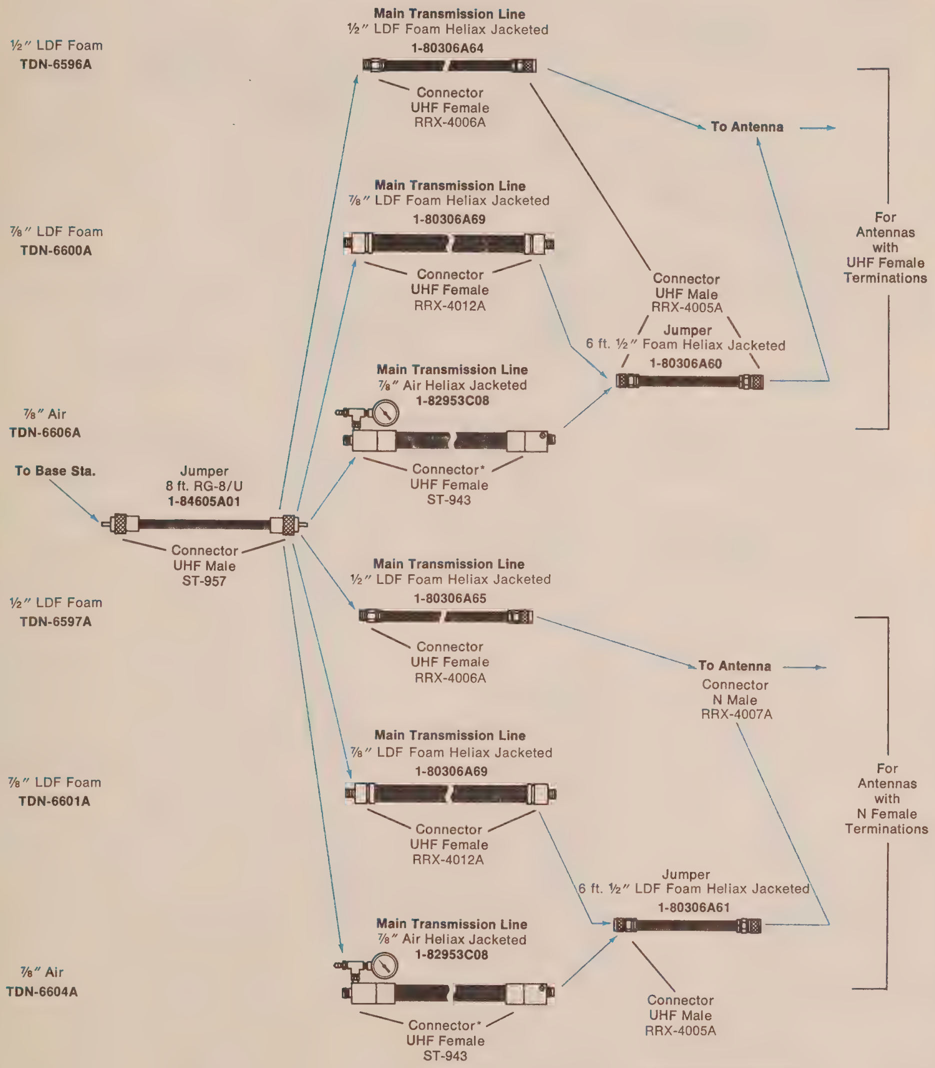
CABLE TYPE	40 MHz	150 MHz	450 MHz
½″ Foam Heliax	0.44	0.86	1.52
⅞″ Foam Heliax	0.23	0.48	0.86
⅞″ Air Heliax	0.23	0.46	0.83

Recommended Line Kits vs. Frequency

CABLE TYPE	25-174 MHz	406-470 MHz	952-960 MHz	IMTS
½ Inch Foam	TDN-6596A	TDN-6597A	TDN-6599A	TDN-6599A
⅞ Inch Foam	TDN-6600A	TDN-6601A	TDN-6602A	TDN-6602A
⅞ Inch Air	TDN-6606A	TDN-6604A	TDN-6605A	Not Applicable
Base Connector	UHF Male	UHF Male	Type N Male	Type N Male
Ant Connector	UHF Male	Type N Male	Type N Male	Type N Male

The transmission line shown above is available only in multiples of 10 feet. Kits include jumper cables for tying the transmission line to the base station and antenna. 25-174 MHz and 406-470 MHz kits contain 8 feet of RG-8/U for base station tie-in, 952-960 MHz and IMTS kits contain 8 feet of RG-9/U for base station tie-in. ⅞″ transmission line kits contain 6 feet of ½″ foam line for antenna tie-in. ½″ foam transmission lines do not include jumper cables to the antenna. Kits also include binding material, silicone grease, vinyl tape and base station jumper mounting hardware. Connectors are attached to line at factory unless otherwise specified. Standard tools can be used to complete the installation.

25-174 MHz and 406-470 MHz

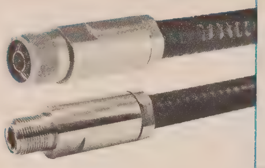

½″ LDF Foam
TDN-6596A
Main Transmission Line
½″ LDF Foam Heliax Jacketed
1-80306A64
Connector
UHF Female
RRX-4006A
To Antenna
⅞″ LDF Foam
TDN-6600A
Main Transmission Line
⅞″ LDF Foam Heliax Jacketed
1-80306A69
Connector
UHF Female
RRX-4012A
Connector
UHF Male
RRX-4005A
Jumper
6 ft. ½″ Foam Heliax Jacketed
1-80306A60
For
Antennas
with
UHF Female
Terminations
⅞″ Air
TDN-6606A
Main Transmission Line
⅞″ Air Heliax Jacketed
1-82953C08
Connector*
UHF Female
ST-943
To Base Sta.
Jumper
8 ft. RG-8/U
1-84605A01
Connector
UHF Male
ST-957
½″ LDF Foam
TDN-6597A
Main Transmission Line
½″ LDF Foam Heliax Jacketed
1-80306A65
Connector
UHF Female
RRX-4006A
To Antenna
Connector
N Male
RRX-4007A
⅞″ LDF Foam
TDN-6601A
Main Transmission Line
⅞″ LDF Foam Heliax Jacketed
1-80306A69
Connector
UHF Female
RRX-4012A
For
Antennas
with
N Female
Terminations
Jumper
6 ft. ½″ LDF Foam Heliax Jacketed
1-80306A61
⅞″ Air
TDN-6604A
Main Transmission Line
⅞″ Air Heliax Jacketed
1-82953C08
Connector*
UHF Female
ST-943
Connector
UHF Male
RRX-4005A

Cable Only Part Numbers

30-80329A22	½″ LDF Foam Heliax Jacketed
30-80329A23	⅞″ LDF Foam Heliax Jacketed
30-82954C02	⅞″ Air Heliax Jacketed
30-82345	RG-8/U

*ST-945 Valve and gauge assembly not included.

Transmission Line Accessories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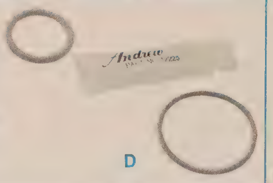
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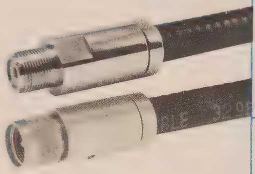
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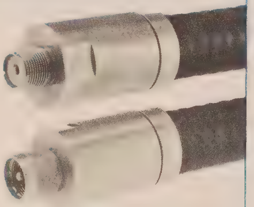
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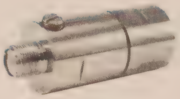
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Connectors for ½″ & ⅞″ LDF Heliax Cable

A Type "N" for ½″ LDF heliax cable.

RRX-4007A	Male (Type L44W).
RRX-4008A	Female (Type L44N).

B "UHF" for ½″ LDF heliax cable.

RRX-4006A	Female (Type L44U).
RRX-4005A	Male (Type L44P).

C "UHF" for ⅞″ LDF heliax cable.

RRX-4012A	Female (Type L45U).
RRX-4013A	Male (Type L45P).

"N" for ⅞″ LDF heliax cable.

RRX-4011A	Female (Type L45N).
RRX-4014A	Male (Type L45W).

D Replacement "O" ring kit for LDF heliax cable connectors.

RRX-4015A	For ½″ connectors.
RRX-4016A	For ⅞″ connectors.

Mounting Kit

E Copperweld wire kit, contains twenty 18″ lengths of copperweld wire (#14 steel wire w/copperweld sheathing). This material is already included in the TDN-6009A thru 14A transmission line kits, furnished at the recommended rate of one 18″ length per 5 feet of transmission line. The TDN-6015A is to supply any additional requirement for copperweld binding material. One TDN-6015A fastens 100 feet of transmission line to the tower.

TDN-6015A

Connectors for ⅞″ Air Heliax Cable

F EIA flange includes inner connector and gasket.

ST-940 Type 75 AR.

G Inner Conductor Adaptor used to connect EIA .291″ to RETMA .263″.

ST-942 Type 4850A

Note: Antennas and Air Type Transmission Kits manufactured prior to March 1, 1962 have a center conductor inner diameter of .263″. All Antennas and Air Line Kits shipped since then have been supplied with a .291″ center conductor. When replacing old ⅞″ (740 Type) Air Line with new ⅞″ air heliax, order Center Conductor Adaptor (Type 4850A) ST-942 above.

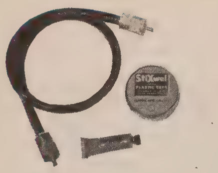
H "UHF" Female for ⅞″ air heliax. Not recommended for use over 470 MHz.

ST-943 Type 75 AU.

I "N" Female for ⅞″ air heliax.

ST-944	Type 75 AN.
32-866944*	Replacement Gasket (seals against threaded portion of heliax).
32-866945*	Replacement "O" ring (1⅛″ dia.)

*Required when reinstalling 75U and 75N end seals to repaired line.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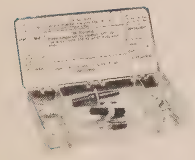
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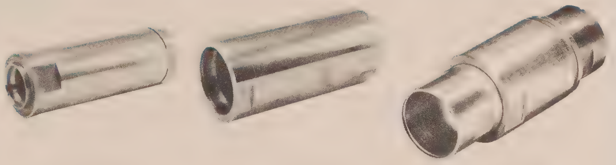

RRX-4009A RRX-4010A ST-933

G

Transmission Line

TK-173 (RG8/U) Line Kits

A Consists of RG8/U cable terminated in PL259 connectors. Supplied with a roll of Vinyl Tape and a ¼ oz. tube of Silicone grease to ensure a weatherproof installation. Sold in std. lentghs of 25, 50, 75, 100, 125, 150, 175 or 200 ft. Always specify exact length in part number.

RG8/U Recommended Maximum Length

FREQUENCY	LENGTH
25-54 MHz	120 ft.
66-88 MHz	90 ft.
136-174 MHz	60 ft.
406-470 MHz	30 ft.
952-960 MHz	Not Recommended

Attenuation per 100 feet in dB

40 MHz—1.12 150 MHz—2.5 450 MHz—5.0

NUMBER	LENGTH	NUMBER	LENGTH
TK-173025	25 ft.	**TK-173100**	100 ft.
TK-173050	50 ft.	**TK-173150**	150 ft.
TK-173075	75 ft.	**TK-173200**	200 ft.

*Lengths over 200 feet are available upon special order.

PK-526, RG8/U Cable Fittings Only

The PK-526 coaxial cable fitting kit provides the parts required for weatherproof UHF male connector terminations of RG8/U solid dielectric coaxial cable for interconnecting antennas and stations. Kit consists of two PL259 male UHF connectors, a ¼-ounce (7 gram) tube of silicone grease (Dow Corning #4), a 25-foot (7.6-meters) roll of ¾-inch (19mm) vinyl tape, and installation instructions.

PK-526 Cable fittings for RG8/U Coaxial cable

RG9/U and RG142/Coaxial Cable

PK-609	50 ft. RG9/U
PK-610	50 ft. RG142B/U

RG8/U, 9/U & 11/U Connectors

PART NUMBER	FIG.	DESCRIPTION	MIL OR OTHER NO.
24-42310	B	Plug PL-259 insulation glass filled diallyphthalate insulation. Suggested use VHF frequencies and below. (Nickel plated barrel soldering braid difficult.)	PL-259
28-82021G01	C	PL-259 plug teflon insulation. Suggested use all VHF & UHF frequencies up to 1 GHz. (Nickel plated barrel causes soldering of braid to be difficult.)	PL-259
28-80325A29	C	PL-259 plug same as 28-82021G01 except barrel is silver plated which allows easy soldering of the braid.	PL-259
58-854020	D	Reducer used with PL259 for RG58/U, RG142/U, .207 I.D.	UG175/U
28-852527	E	Male "N" Plug for RG58A/U Cable Hole .212	UG-536/U

Cable and Connector Repair Kit

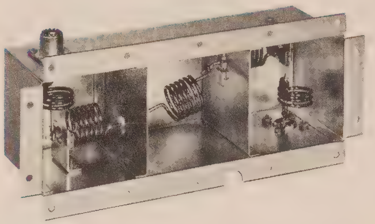
F For foam and air heliax transmission lines, the kit consists of a 25-piece assortment of the most common connectors and adaptors for type 4850A, 18275, L44U, L45U, L44P, L44N and L44W connectors. End extra service calls and "down" time by having this handy kit in your tool box. Each part in the compartment plastic case is identified by Motorola part number and description.

RPX-4027A Kit

Copper Line Splices

G Copper line splices are ideal for making a weatherproof mend in either foam or air heliax transmission line so the characteristic impedance of the line is not upset. The ends of the cable are connected to the two halves of the splice in the accepted manner, and the halves are fastened together with a sleeve. The installation is performed with standard, readily available tools.

RRX-4009A	(L44Z Splice)—½" copper foam heliax line with an impedance of 50 ohms.
RRX-4010A	(L45Z Splice)—⅞" copper foam heliax transmission line with an impedance of 50 ohms.
ST-933	(75AZ Splice)—⅞" copper air heliax transmission line with an impedance of 50 ohms.



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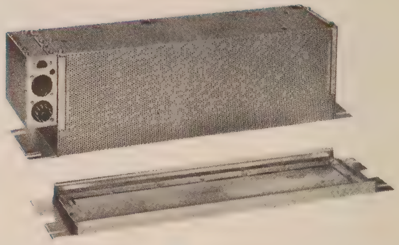


B

MOTOROLA
PRECISION CRYSTAL FILTER
INPUT
MODEL
SER. NO.
FREQ.
MC

C

Harmonic Filters

A The TLD-6651A and TLD-6652A Transmitter Harmonic filters are designed for use with 375 watt upright base stations in the 136 to 174 MHz range.

MODEL NO.	FREQUENCY RANGE
TFB-6011A	25-30 MHz
TFB-6012A	30-36 MHz
TFB-6013A	36-42 MHz
TFB-6014A	42-50 MHz
TLD-6651A	136-150.8 MHz
TLD-6652A	150.8-174 MHz

Filtering and Shielding Kits

B Receiver Shield and Filter Kits are designed to shield a receiver chassis and its cabling from extraneous RF pick up. They are used primarily in stations where the receiver is used to actuate an associated transmitter relay circuit such as Repeaters.

Receiver shield kit for 450-470 MHz "Sensitron" receivers used in repeater applications.

TLN-8889A Shield Kit

The TLN-6134A Transmitter Bottom Cover Kit is intended to shield the bottom of the transmitter chassis only. It is used primarily where unwanted multiplied stage radiation must be reduced to a minimum.

TLN-6134A Bottom Cover Kit

Precision Crystal Filters

Supplied by Crystal Service Dept.*

C Unique properties of the Motorola Precision Crystal Filter provide outstanding attenuation of unwanted signals at adjacent and alternate channels. Extensive field tests and enthusiastic acclaim from users who have solved their interference problems with the filter attest to its excellence. Narrow bandpass provides as much as 20 db reduction in desensitization interference, depending upon the operating frequency and channel separation. Effect of the filter on IM products and receiver spurious response is equally startling. A minimum of —15 db is obtainable with adjacent and alternate channel interference, —20 db or more on all others.

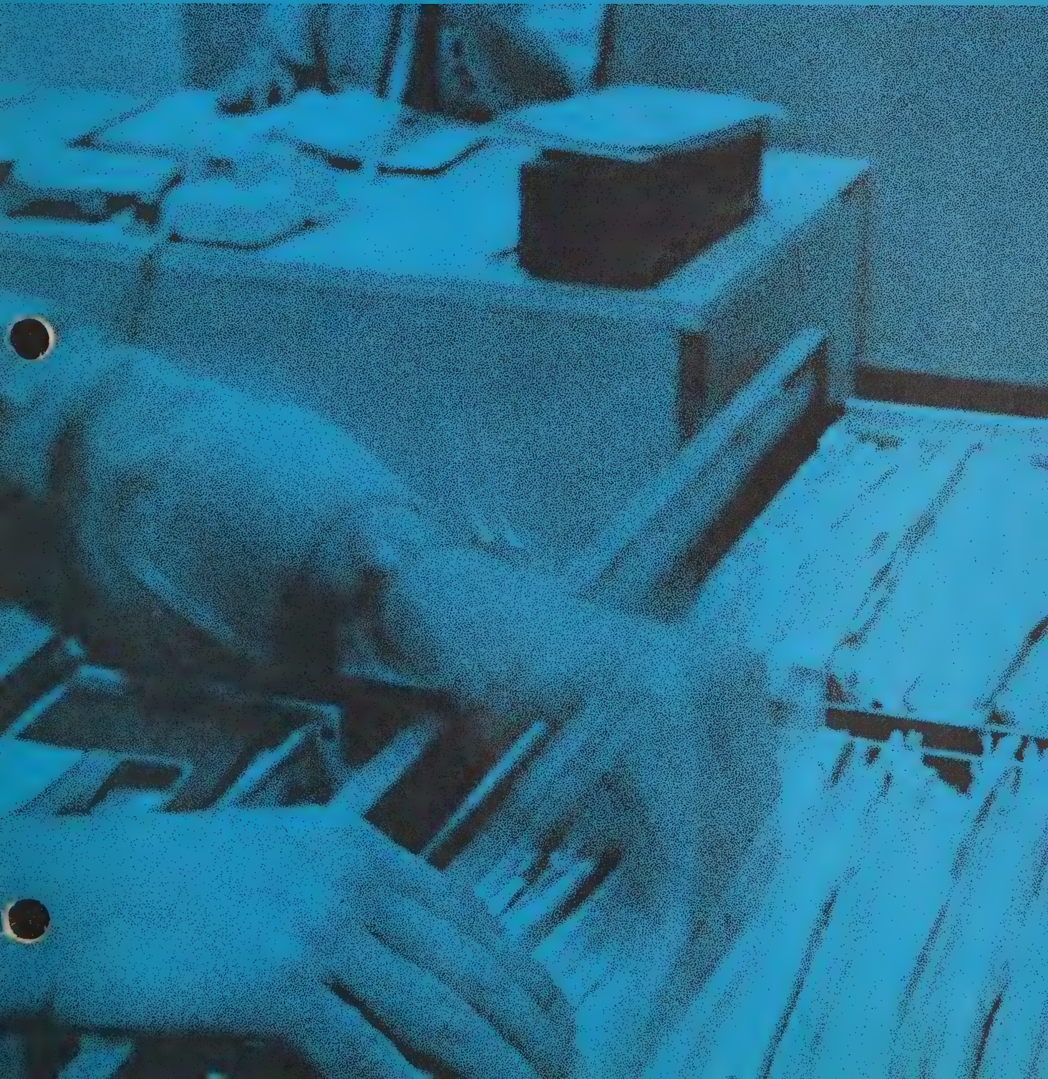
*Because of system considerations, it is always advisable to contact your Motorola Radio Communications Representative before ordering.

The Parts Department

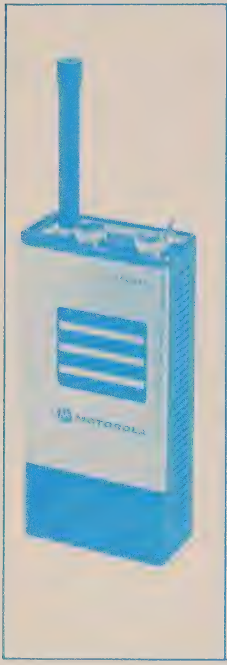
of the Motorola Communications Group

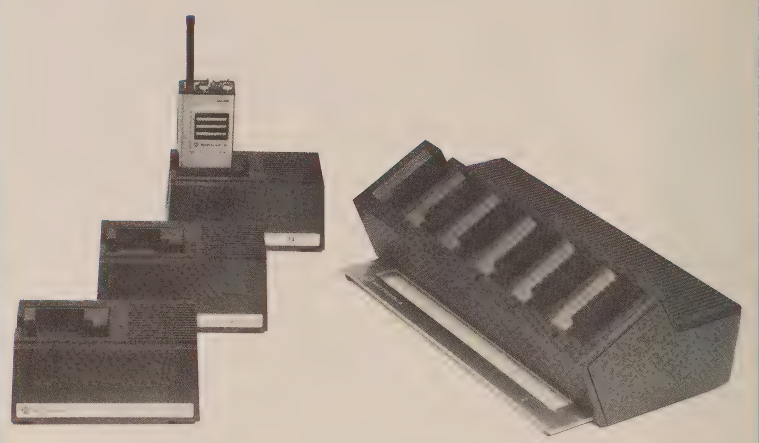
Technical Aid

Trained technicians, located at the Parts Department warehouse in Lombard, Illinois have extensive history files and are always available to aid you in identifying parts.



MX300 Series Accessories





A

Nickel-Cadmium Batteries

MX300 series batteries are available in different sizes, giving the user complete flexibility in the choice of duty cycle and hours of operation. Battery choices include four capacity levels and three rates. All batteries can be trickle charged in about 14 hours.

Type:

Light Capacity

60-5224C03 (replaces **NLN-4002A**) 1 hr. charge

Medium Capacity

60-5201E01 (replaces **NLN-8834B**) 1 hr. charge

High Capacity

60-5201E02 (replaces **NLN-8835B**) 1 hr. charge

Ultra-High Capacity

60-5222C03 (replaces **NLN-8833A**) 7/14 hr. charge

Typical Batteries for MX300 Series Radios

BATTERY				TYPICAL HOURS OF OPERATION					
NUMBER	CAPACITY	MINIMUM CHG. TIME	DUTY CYCLE	1 W VHF	1 W UHF	2.5 W VHF	2.0 W UHF	6.0 W VHF	5.0 W UHF
60-5201E03	Light	1 Hr	5-5-90	9	7	6	6	*	*
			10-10-80	5	4	3	3	*	*
60-5201E01	Medium	1 Hr	10-10-80	7	6	5	5	*	*
60-5201E02	High	1 Hr	10-10-80	13	11	8	8	5	4
60-5222C03	Ultra-High	7 Hrs.	5-5-90	43	36	29	29	17	16
			10-10-80	26	22	17	17	9	9

NOTE: A 5-5-90 duty cycle refers to 5% transmit, 5% receive, and 90% standby time.

*Indicates not recommended battery-radio combination.

Battery Chargers

A Single and multiple unit chargers are available in one, seven or fourteen hour charge rates. These attractively-styled units will accept either the complete radio or the battery only. All chargers have indicator lights which glow red during the charging cycle. One and seven hour chargers have a green light which illuminates when charging is complete.

The multiple unit chargers accept up to six batteries or radios at once. Because battery capacities differ, each compartment has its own indicator light(s).

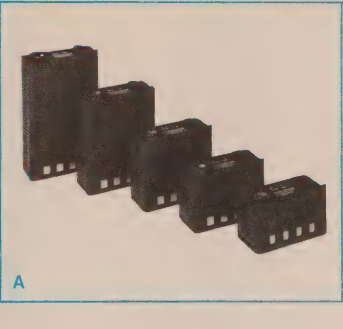
Single Unit

NLN-8858A	1 hr. charge time 117v.
NLN-8857A	7 hr. charge time 117v.
NLN-8856A	14 hr. charge time 117v.
NLN-4038A	1 hr. charge time 230v.
NLN-4037A	7 hr. charge time 230v.
NLN-4036A	14 hr. charge time 230v.

Multi-Unit

NLN-8988A	1 hr. charge time 117/230v.
NLN-8989A	7 hr. charge time 117/230v.
NLN-8990A	14 hr. charge time 117/230v.

MX 300 Series Radio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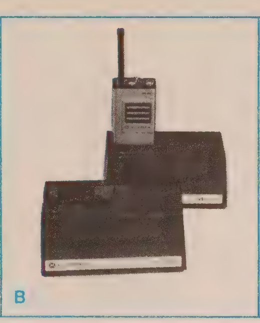

B

C
Wall Mount Kit
Rack Mount Kit

Batteries

Both non-rechargeable primary and rechargeable nickel-cadmium batteries are available for the MX-300 series radio. All batteries have a quick-release connector which allows removal and installation in seconds.

Primary Non-Rechargeable Mercury Battery

Primary batteries are ideal for extended use away from centralized facilities. Typically provides 25-35 hours of operation. Must be used in conjunction with "B" version low and medium power MX-300 Series portable only. Battery measures 2.2 inches high (55.8 mm).

60-5948D01	Primary Mercury Battery (replaces NLN-8838).

Nickel-Cadmium Batteries

A MX300 series radio batteries are available in different sizes and capacities, giving the user complete flexibility in the choice of duty cycle and hours of operation.

Rechargeable nickel-cadmium batteries offer most economical operation when use time is predictable or for multi-shift operations using spare batteries. Typically provides 8 hours operation per charge. Rapid charge and standard charge nickel-cadmium batteries consist of 6 cells of nominal 1.25 volts each giving a fully charged initial load voltage of 7.8 volts.

Two of the rapid charge batteries are Factory Mutual approved for certain hazardous atmospheres. A MESA (Mining Equipment Safety Association) approved version is available in the two most popular rapid charge sizes. A CSA (Canadian Standard Association) version is also available. (See chart for order numbers).

Nickel-Cadmium Batteries
Rapid 1 Hour Charge

Part No.	Model	Kit No.	Height		Weight		Cycle Life	Hours of Operation						
			in.	mm.	oz.	gm.		Duty Cycle†	1W VHF	1W UHF	2.5W VHF	2.0W UHF	6.0W VHF	5.0W UHF
60-05201E03	Light Capacity	NLN-4002	1.47	37.3	5.2		500	5-5-90 10-10-80	9 5	7 4	6 3	6 3	NR♦	NR♦
60-05201E01	Medium Capacity	NLN-8834*	1.83	46.5	7.3		500							
60-05452E01		NLN-8840*	1.83	46.5	7.3		500	10-10-80	7	6	5	5	NR♦	NR♦
60-05471F01		NLN-4891***	3.40	86.3	10		500							
60-05201E02	High Capacity	NLN-8835**	3.40	86.3	14.1		500	10-10-80	13	11	8	8	5	4
60-05452E02		NLN-8841**	3.40	86.3	14.1		500							

*FM Approval—Class I, Division I, Group C&D. Class II, Division I & II, Group E,F&G. NLN 8840 also MESA Approved.

**FM Approval—Class I, Division I, Group D. Class II, Division I & II, Group E,F&G. NLN 8841 also MESA Approved.

***Canadian Standard Association (CSA)—Class I, Division I, Group A,B,C&D.

†Denotes—A 5-5-90 duty cycle refers to 5% transmit, 5% receive, and 90% standby time.

♦Denotes not recommended battery-radio combination.

SPECIFICATIONS (Nickel-Cadmium Batteries)

Fully Charged Voltage	7.8 Volts
End of Discharge Voltage	6.0 Volts
Max. Temp. During Charge	50°C 122°F
Min. Temp. During Charge	5°C 41°F
Charge Coefficient	120% @ C/1 Rapid Charge Rate 140% @ C/10 Standard Charge Rate
Maximum Rapid Charge Current	1.2C Rate (C=mAh)
Maximum Standard Charge & Continuous Charge Current	C/10 (C=mAh)
Shelf Life	2 Years
Size	2.75"x1.44"xHeight

Single Unit Battery Chargers

B Single unit chargers are ideal for small system users or non-centralized charging facilities. These chargers are designed for desk-top use and are capable of charging a battery on or off the radio. When the battery is fully charged, the charger automatically resets to a trickle charge rate. Rapid charge (1 hour) batteries must be charged in the rapid charge unit to attain the rapid charge rate. Visual indication is provided in the rapid charger when the battery is fully charged.

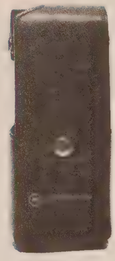
NLN-8858A	1 hr. charge time 117v.
NLN-8856A	14 hr. charge time 117v.
NLN-4038A	1 hr. charge time 230v.
NLN-4036A	14 hr. charge time 230v.

Multiple Unit Battery Chargers

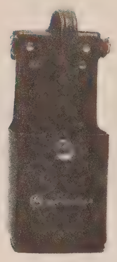
C Multiple unit chargers are designed for large users or multishift operations where spare batteries are required. These chargers can be desk, wall or rack mounted and will accommodate up to 6 radios or batteries. Other features are similar to the single unit chargers.

NLN-8988A	1 hr. charge time 117/230v.
NLN-8990A	14 hr. charge time 117/230v.
NLN-4127A	Wall Mount Kit for 6 Unit Charger
NLN-4128A	Rack Mount Kit for 6 Unit Charger

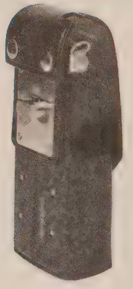
MX 300 Series Radio



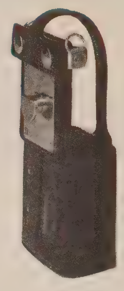
Belt Loop Case with Full Cover



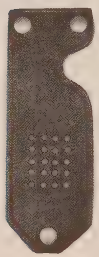
Belt Loop Case with "T" Strap Cover



Swivel Case with Full Cover

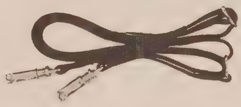


Swivel Case with "T" Strap Cover

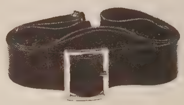


Cover for Carrying Case

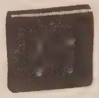
"T" Strap for all Carrying Cases



Carrying Strap Belt



Belt



Spare Belt Loop for Swivel Case

Carrying Cases

Standard belt loop carrying cases with snap-on/off perforated full covers provide maximum protection, yet permit audio to be heard clearly. T-strap covers permit easy access to all controls. Sturdy black leather. Heavy-duty snaps on integral belt loop permit quick attachment and release (fits belts up to 3 inches). For over the shoulder carry, the adjustable sturdy black nylon carrying strap is recommended. Swivel carrying cases attach to belt loop attachment by inverting radio. Radio swings freely on belt loop attachment, adjusting to body movements walking or sitting. Sewn belt loop attachment fits up to 3 inches. Other features similar to standard case.

A number of sizes of each type are available to satisfy the demands of any combination of batteries and radios—which determine the overall height of the unit. The cover or the strap is ordered separately.

See chart below for case part numbers.

15-5332D01	Full Cover for Carrying Case (replaces NLN-8836).
42-5360D01	T-Strap for Carrying Case (replaces NLN-8837).
42-82608H01	Carrying Strap for Leather Carrying Case (replaces NLN-6349).
42-865599	Belt, 1¾ inches wide, black (replaces NLN-6042).
42-5857B01	Spare Belt Loop 3", for Swivel Case (replaces NLN-4365).

Case selection is governed by both housing and battery size. Numbers shown in italics are swivel cases.

Battery		**Housing Size**					
Capacity	**Hrs.**	**310**	**320**	**330**	**340**	**350**	**360**
60-05201E03 light	1 hour rapid	NLN-8863A *NLN-4117A*	NLN-8864A *NLN-4118A*	NLN-8864A *NLN-4118A*	NLN-8865A *NLN-4119A*	NLN-8866A *NLN-4121A*	NLN-8868A *NLN-4122A*
60-05201E01 60-05452E01 medium	1 hour rapid	NLN-8863A *NLN-4117A*	NLN-8864A *NLN-4118A*	NLN-8865A *NLN-4119A*	NLN-8865A *NLN-4119A*	NLN-8867A *NLN-4121A*	NLN-8868A *NLN-4122A*
NLN-8838A	primary	NLN-8864A *NLN-4118A*	NLN-8865A *NLN-4119A*	NLN-8866A *NLN-4120A*	NLN-8867A *NLN-4121A*	NLN-8868A *NLN-4122A*	NLN-8869A *NLN-4123A*
60-05471F01 medium 60-05201E02 60-05452E02 high	1 hour rapid	NLN-8866A *NLN-4120A*	NLN-8867A *NLN-4121A*	NLN-8868A *NLN-4122A*	NLN-8869A *NLN-4123A*	NLN-8870A *NLN-4124A*	NLN-8871A *NLN-4125A*
60-05201E04 ultra high	1 hour rapid	NLN-8868A *NLN-4122A*	NLN-8869A *NLN-4123A*	NLN-8870A *NLN-4124A*	NLN-8870A *NLN-4124A*	NLN-8871A *NLN-4125A*	NLN-8872A *NLN-4126A*

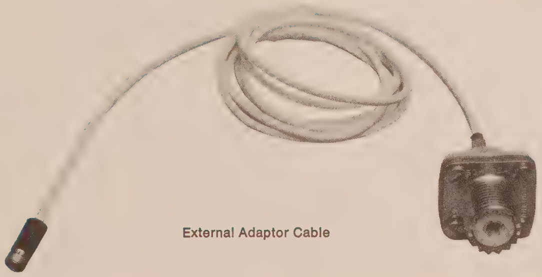
MX 300 Series Radio

VHF Heliflex

UHF Heliflex

Public Safety Remote Speaker Microphone Antenna

UHF Flexible Whip



External Adaptor Cable

Antennas

Heliflex

A Heliflex antennas are short and flexible. Ideal for all MX 300 series radios. Especially practical where obstacles are present. Provide good reception and transmission. Long life, rubberize/coating, 85-5718C05 and C06 (NAE-6132-3) can only be used with the public safety remote microphone.

VHF Antennas

85-5718C01	136-150.8 MHz (replaces NAD-6282)
85-5718C02	150.8-162 MHz (replaces NAD-6283)
85-8718C03	162-174 MHz (replaces NAD-6284)

UHF Antennas

85-5718C04	403-430 MHz (replaces NAD-6231)
85-5718C05	440-470 MHz (replaces NAD-6232)
85-5718C06	470-512 MHz (replaces NAD-6233)

Public Safety Remote Speaker/Microphone Antennas

85-5566A03	403-430 MHz (replaces NAE-6131A)
85-5566A04	440-470 MHz (replaces NAE-6132A)
85-5566A05	470-512 MHz (replaces NAE-6133A)

Flexible Whip

B Flexible whip antenna provides protection when used near obstacles. Snaps back to an upright position. Extends well above body-shielding effects for excellent reception and transmission.

85-5268F01	403-512 MHz (replaces NAE-6222A)

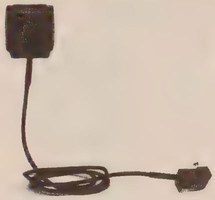
External Antenna Adaptor Cable

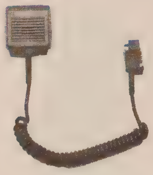
C All MX 300 series radios incorporate an external antenna jack allowing the radio to be connected to a vehicular antenna via an adaptor cable.

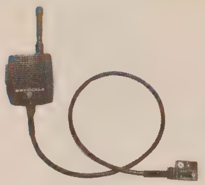
NKN-6223A	External Antenna Adaptor Cable

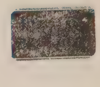
MX 300 Series Radio

A


Remote Speaker Microphone Straight Cord with Clip Back

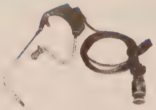

Remote Speaker Microphone Coil Cord with Clip Back


Remote Speaker Microphone with Antenna, Velcro Patch and High/Low Switch

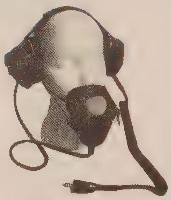

Velcro Patch Pin Attachment (for NMN-6072 MIC)

B

Safety Helmet Headset


Earpiece Headset Microphone

Noise Cancelling Headset/Microphone with Boom Mike


Noise Cancelling Headset/Microphone with Cup Mic

Earpiece, without Volume Control

Cable Adaptor for NMN-6064/NMN-6065

C

Surveillance Accessory

Remote Operation Accessories

All radios in the MX 300 series have an internal speaker/microphone, but will also operate with external speakers and speaker/microphones.

Remote Speakers/Microphones

A Remote speaker/microphone allows user to talk and listen without removing radio from belt or carrying case. Ideal in high noise level areas. Separate microphone and speaker within the same housing provide high quality reception and transmission. Straight and coil cord remote units have back clip for attachment to upper garment. Coax cord remote units include antenna connector, high/low audio switch and Velcro backing for secure attachment to Velcro patch pinned to upper garment.

NMN-6070B	Remote speaker-microphone with straight cord and clip back.
NMN-6071B	Remote speaker-microphone with coiled cord and clip back.
NMN-6072A	Public safety remote speaker-mic with antenna connector, velcro backing, and high/low switch. (For UHF Radios)
NLN-8410A	Velcro patch pin attachment for NMN-6072A mic.

Headsets

B Three styles of headsets adapt to any hazardous or routine job. Safety helmet/face mask headset attaches to safety helmet (adaptor required). Earpiece headset rests lightly but firmly on ear and eliminates need for headband. Noise cancelling type headset all but eliminates outside interference in high ambient noise environments.

Now you can maintain portable two-way communications in high ambient noise areas with Motorola noise cancelling accessories.

Headset Model NMN-6064 includes two speaker ear muffs with adjustable boom microphone for use in moderate to high noise environments. For noise areas above 120dB, model NMN-6065 is offered. This model comes with two speaker ear muffs and a shielded cup microphone. Both of these weather-resistant models can be worn with or without a safety type helmet. Adaptor cable required for connecting to radio.

NMN-6050A	Headset with mic; Helmet/face mask type.
50-84972H01	Headset with mic; Earpiece type (replaces NMN-6056).
NLN-8875A	Adaptor required for NMN-6050 and NMN-6056.
50-5394E01	Earpiece without volume control (replaces NSN-6028A).
NMN-6064A	Headset with boom microphone.
NMN-6065A	Headset with cup microphone.
NKN-6207A	Adaptor required for NMN-6064 and NMN-6065.

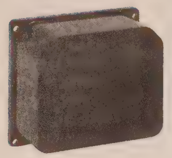
Surveillance Accessory

C For unobtrusive communications, earpiece speakers and remote microphones provide maximum concealment. An earpiece speaker / miniature microphone / push-to-talk switch assembly can be used in lieu of the remote speaker/microphone on all models. Miniature microphone clips to lapel or under tie. Push-to-talk switch is easily concealed in the palm of your hand with the cord running up the sleeve.

NMN-6091A	VHF surveillance accessory
NMN-6092A	UHF surveillance accessory

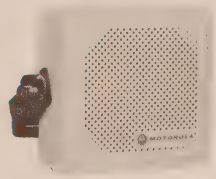
MX 300 Series Radio

CONVERTA-COM Console


CONVERTA-COM
Console Extender

Antenna

Remote Microphone



Speaker

Mobile Operation

MX 300 Series Radio CONVERTA-COM Console Mobile Operation

Mobile microphone and speaker exhibit same high quality found in other Motorola mobile radios. Palm-type microphone with coil cord and push-to-talk switch improves fidelity over integral radio microphone. Separate speaker/cable kit provides improved audio quality and intelligibility over integral radio speaker. Universal mounting bracket supplied for versatile mounting. Hang-up clip on rear of speaker permits temporary hanging of speaker on door window for improved monitoring outside vehicle. Integral microphone and speaker automatically circumvented when portable unit inserted into console when speaker option is used.

All MX 300 series portable radios (except MX 310) are universal CONVERTA-COM.

NLN-4350A	CONVERTA-COM Console (see chart below for appropriate extender pocket).
NLN-4134A	Standard 1.5 in extender pocket.
NLN-4135A	Optional 3 in extender pocket.
NKN-6226A	DC Cable Kit to connect power from vehicle to console.
TMN-6054A	Remote Microphone.
NSN-6027A	12 Watt (audio) speaker.
NSN-6026A	½ Watt (audio) speaker.

VHF Roof Antenna

TAD-6111A	136-144 MHz
TAD-6112A	144-152 MHz
TAD-6113A	152-162 MHz
TAD-6114A	162-174 MHz

UHF 5dB Gain Antenna

TAE-6061B	403-430 MHz
TAE-6062B	450-470 MHz
TAE-6064B	470-494 MHz
TAE-6065B	494-512 MHz

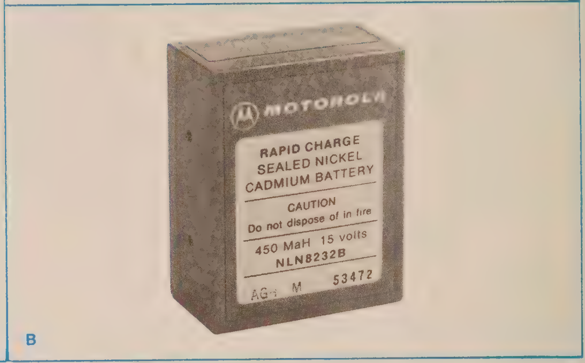
Pocket Extension Option Usage

Battery		**Housing Size**				
Capacity	**Hrs.**	**320**	**330**	**340**	**350**	**360**
60-05201E03 light	1 hour rapid	std.	std.	std.	std.	std.
60-05201E01 60-05452E01 medium	1 hour rapid	std.	std.	std.	std.	NLN-4135
60-05471F01 medium		std.	std.	NLN-4135	NLN-4135	NLN-4135
60-05201E02 60-05452E02 high	1 hour rapid					
60-05201E04 ultra high	1 hour rapid	NLN-4135	NLN-4135	NLN-4135	N/A	N/A
NLN-8838A	Primary	std.	NLN-4134A	NLN-4134A	NLN-4134A	NLN-4135A

MT 500 Series Radio

MOTOROLA
SEALED MERCURY BATTERY
WARNING
Do not recharge. May explode if disposed of in fire
1800 MaH 16.2 volts
NLN6762A
Made in U.S.A. U.S. Patent 3096217 et al

A


MOTOROLA
RAPID CHARGE SEALED NICKEL CADMIUM BATTERY
CAUTION
Do not dispose of in fire
450 MaH 15 volts
NLN8232B
AG M 53472

B

Batteries

Mercury

A Mercury batteries are ideal for extended use away from centralized facilities. Typically provides 25-30 hours of operation. RF output power reduced by one-half.

60-83582H01	Slimline (Replaces NLN-6683A)
60-84342H01	Omni, low power (Replaces NLN-6762A)
60-84815H01	Omni, high power (Replaces NLN-6936A)

Nickel-Cadmium

B Rechargeable nickel-cadmium batteries offer most economical operation when use time is predictable or for multi-shift operations using spare batteries. Typically provides 8 hours' operation per 16-hour charge (standard charge battery) or 1-hour charge (rapid charge battery). Provides full rated RF output power. Rapid charge nickel-cadmium secondary batteries are made up of 12 cells of nominal 1.25 volts each giving a fully charged initial load voltage of 15.6 volts.

The batteries have a dual charge feature. "MT500" radio nickel-cadmium batteries have been designed for interchangeable use in both 16-hour slow charge and 1-hour rapid charge battery chargers. You can select the mix of battery chargers and charge rates best suited for your system's operational needs without stocking separate battery types. The new dual-charge battery can be charged either in or outside of the radio and is compatible with all HT 200 radios.

See chart below for ordering information:

Part No.	Model	Kit No.	Service Life	Weight	Cycle Life
60-05737E01	Slimline	NLN-4462	2W 8 hrs.	5.3 oz.	150 cycles
60-05742E01	Omni	NLN-4463	5W 8hrs. 2W 14 or 9*hrs.	8.2 oz.	500 cycles
60-05295A03	Omni-Safe**	NLN-8232	LP 8 hrs.	9.3 oz.	500 cycles

*10-10-80 duty cycle; all others 5-5-90 duty cycle. **FM Approval—Class 1, Division 1, Group C&D.

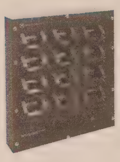
SPECIFICATIONS (Nickel-Cadmium Batteries)

Fully Charged Voltage	15.6 Volts Min.
End of Discharge Voltage	12.0 Volts
Max. Temp. During Charge	50°C 122°F
Min. Temp. During Charge	5°C 41°F
Charge Coefficient	120% @ C/1 Rate

Maximum Rapid Charge Current		1.2C Rate (C=mAh)
Maximum Standard Charge & Continuous Charge Current		C/6 (C=mAh)
Shelf Life		2 Years
Size	Slimline	2.76 x 2.18 x 0.76 Inches
	Omni	2.76 x 2.18 x 1.25 Inches

MT 500 Series Radio

A



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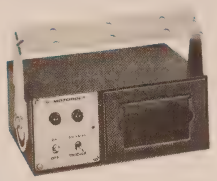

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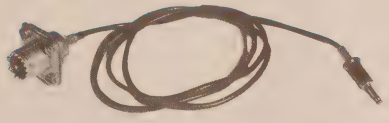

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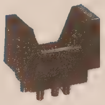


E

Battery Chargers

Single Unit

A Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges battery in or out of radio. Radio operates during charge. Switchable trickle or full-charge rate. Automatically reverts to trickle rate when fully charged. *Rapid-charge battery must be used in rapid-charge charger to attain rapid charge rates.*

NLN-4557A	Standard rate 117v Slimline
NLN-4565A	Rapid rate 117v Slimline
NLN-4559A	Standard rate 220v Slimline
NLN-4567A	Rapid rate 220v Slimline
NLN-4561A	Standard rate 117v Omni
NLN-4569A	Rapid rate 117v Omni
NLN-4563A	Standard rate 220v Omni
NLN-4571A	Rapid rate 220v Omni

Multiple Unit

B Multiple unit charger designed for large system users or multi-shift operations requiring spare batteries. Can be wall-mounted. Accommodates up to 12 radios or batteries. Other features same as single unit. May also be used for HT-220 radios and batteries.

NLN-4558A	Standard rate 117v Slimline
NLN-4566A	Rapid rate 117v Slimline
NLN-4560A	Standard rate 220v Slimline
NLN-4568A	Rapid rate 220v Slimline
NLN-4562A	Standard rate 117v Omni
NLN-4570B	Rapid rate 117v Omni
NLN-4564A	Standard rate 220v Omni
NLN-4572A	Rapid rate 220v Omni

Mounting Bracket and Leg Kits for Multiple Unit Chargers.

NLN-5223A	for standard rate chargers
NLN-5222A	for rapid rate chargers

Vehicular

C Vehicular charger mounts under dash. Other features same as single unit except no rapid-charge capability. Battery power cable kits permit 6 or 12-volt operation. (Order separately.) 24 VDC operation available on special order only. For greater range, connect mobile antenna to rear of charger. Antenna adaptor cable kit must be used to connect antenna on radio to antenna jack on charger during mobile antenna operation. (Order separately.)

NLN-6691A	Slimline Housing
NLN-6892A	Omni Housing
NKN-6149A	Power Cable 6v
NKN-6150A	Power Cable 12v
NKN-6151A	Power Cable 12v w cigar/lighter cable
30-83060A01	Radio to Charger Antenna Cable (Replaces NKN-6246)

Antenna Adaptor Cable Kits

D When operating your portable inside a vehicle, extended range is obtained by using a mobile antenna. Two methods of mobile antenna connection are available. The vehicular charger can be connected to a mobile antenna for operation with either Remote or Universal Models. A second method is to connect any radio directly to the mobile antenna whenever you enter the vehicle. The vehicular antenna adaptor kit contains all cables and connectors necessary for this type of operation. The radio can be left in a carrying case, placed on the seat or above in a sun visor.

NKN-6260A	Antenna Adaptor Cable Kit.

Adaptor Sleeves

E A variety of adaptors allow older HT-200 radio chargers to be used for newer MT-500 or HT-220 standard charge batteries or radios.

NLN-6774A	Modifies HT-200 single or multiple unit chargers to accept MT-500 or HT-220 Slimline radio battery.
NLN-6776A	Modifies HT-200 single or multiple unit chargers to accept MT-500 or HT-220 Omni radios or battery.

MT 500 Series Radio

Standard Carrying Case with Full-Cover

Standard Carrying Case with T-Strap Cover

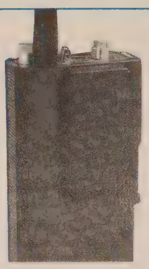
Carrying Strap, all models (Replaces NLN-6349)

A

Swivel Carrying Case with Full-Cover and Belt Loop Attachment.

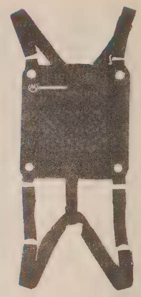
Swivel Carrying Case with T-Strap Cover and Belt Loop Attachment

B



Back Cover with Belt Clip

C Lavaliere and Safety Lanyard



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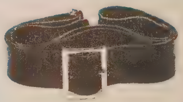


E

Standard Carrying Case*

A Standard carrying cases with snap-on/off perforated full covers provide maximum protection, yet permit audio to be heard clearly. T-strap covers permit easy access to all controls. (Radios with rigid loop antenna must use T-strap cover.) Sturdy black leather. Heavy-duty snaps on integral belt loop permit quick attachment and release (fits belts up to 2½ inches). For over-the-shoulder carry, the adjustable sturdy black nylon carrying strap is recommended.

NLN-6686A	Slimline short housing case and cover
NLN-6738B	Slimline long housing case and cover
NLN-6803B	Slimline short housing case and t-strap
NLN-6844B	Slimline long housing case and t-strap
NLN-6777B	Omni short housing case and cover
NLN-6778B	Omni long housing case and cover
NLN-6845B	Omni short housing case and t-strap
NLN-6846B	Omni long housing case and t-strap
NLN-4787A	Unit ID models (consists of 15-5443F03 case and 42-5297G02 t-strap)
15-5276F06	Slimline short housing, case only
15-5276F08	Slimline long housing, case only
15-5276F05	Omni short housing, case only
15-5276F07	Omni long housing, case only
42-82534J01	T-strap only (replaces NLN-4532)
15-82535J02	Cover only (replaces NLN-4531)
NLN-6795A	Leather case for spare slimline battery
42-82608H01	Carrying Strap (replaces NLN-6349A)

Swivel Carrying Case*

B Swivel carrying cases are used with a belt loop attachment. Radio swings freely on belt loop attachment, adjusting to body movements walking or sitting. Belt loop attachments fit belts up to 2½ or 3 inches. Order the following separately:

15-5276F02	Slimline short housing, case only
15-5276F04	Slimline long housing, case only
15-5276F01	Omni short housing, case only
15-5276F03	Omni long housing, case only
NLN-4789A	Unit ID models, case and cover
42-82534J01	T-strap (replaces NLN-4532)
15-82535J02	Cover only (replaces NLN-4531)
42-82421J06	Detachable swivel belt loop 2½", (replaces NLN-4529)
42-5857B01	Detachable swivel belt loops 3", (replaces NLN-4530)

Back Cover with Belt Clip*

C Radio can be worn on belt without carrying case by replacing conventional back cover on radio with a back cover having a permanent belt clip. For over-the-shoulder carry, the lavaliere and adjustable safety lanyard are recommended. Lavaliere attaches to radio by back cover screws.

NLN-4743A	3-inch clip, slimline long housing
NLN-4744A	3-inch clip, omni long housing
NLN-4448A	1⅝-inch clip, slimline short housing
NLN-4449A	1⅝-inch clip, slimline long housing
NLN-4450A	1⅝-inch clip, omni short housing
NLN-4451A	1⅝-inch clip, omni short housing
NLN-4465A	slimline lavaliere and safety lanyard
NLN-4672A	omni lavaliere and safety lanyard

Chest Pack

D Chest pack keeps radio on chest for maximum hands-free operation. Ideal where body movements might expose radio to damage or hazardous conditions. Safety "break-away" straps go over shoulder and around waist. Fits basic model only.

42-84117H01	Chest Pack (replaces NLN-6731)

Belt

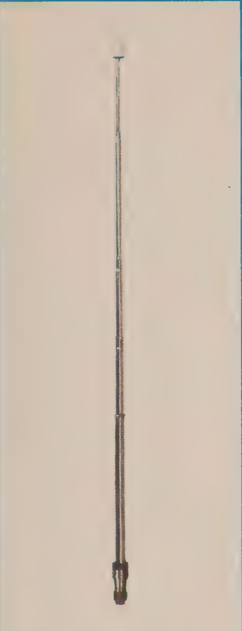
E Adjustable matching black belt recommended for all carrying cases and belt clips.

42-865599	Belt (replaces NLN-6042)

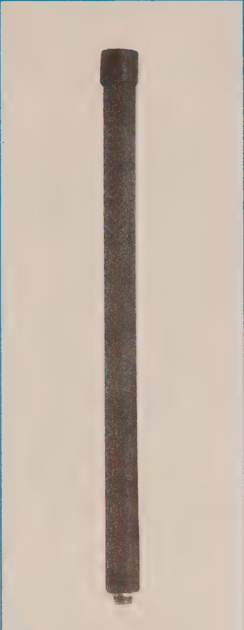
*Housing Dimensions—Check housing dimensions before ordering cases or back covers. Dimensions are less antenna and knobs.

	Short	Long
Slimline	6.97x2.73x1.59 in. 177x69x40 mm	7.62x2.73x1.59 in. 193x69x40 mm
Omni	6.97x2.73x1.85 in. 177x69x47 mm	7.62x2.73x1.85 in. 193x69x47 mm

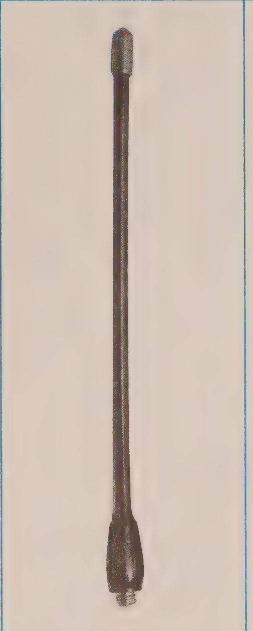
MT 500 Series Radio



A Collapsible Antenna



B Heliflex



C Flexible Whip

D Dribble

Collapsible Antenna

A Collapsible antennas provide protection from damage when radio is not in use. Extends well above body-shielding effects for excellent reception and transmission. Number of sections determine height.

85-5509E01	136MHz to 162MHz, 6 sect. (replaces NAD-6322)
85-5549E01	162MHz to 174MHz, 5 sect. (replaces NAD-6324)
85-5550E01	406MHz to 512MHz, 2 sect. (replaces NAD-6271)

Heliflex Antenna

B Heliflex antennas are short and flexible. Especially practical where obstacles are present. Provides good reception and transmission. Letter-stamped for identification.

85-82283J05	136-142 MHz "A" (replaces NAD-6221)
85-82283J06	142-150.8 MHz "B" (replaces NAD-6222)
85-82283J03	150.8-162 MHz (replaces NAD-6219) "C"
85-82283J02	162-174 MHz (replaces NAD-6220) "D"
85-5566A04	450-470 MHz (for public safety speaker/mics only) (replaces NAE-6132)
85-5566A05	470-512 MHz (for public safety speaker/mics only) (replaces NAE-6133)

Flexible Whip Antenna

C Flexible Whip antenna provides protection when radio is used near obstacles. Snaps back to upright position. Extends well above body-shielding effects for excellent reception and transmission.

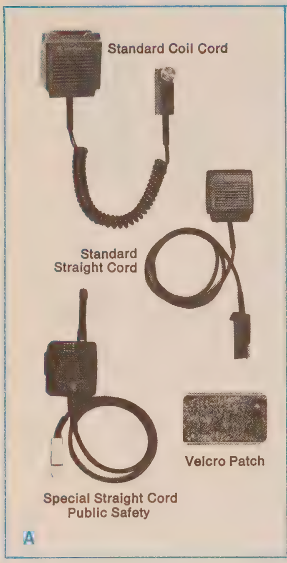
NAE-6050B	406-420 & 450-512 MHz

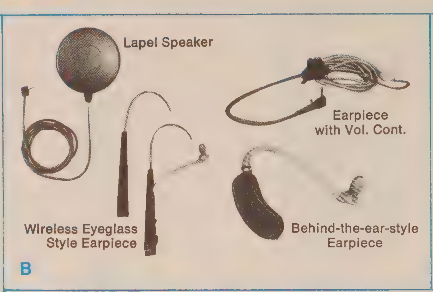
Dribble Antenna

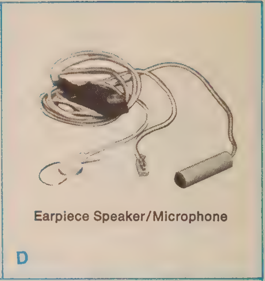
D Dribble antenna recommended for chest pack use or where extended antenna may be hazardous or undesirable. Hangs down out of the way. Limited range.

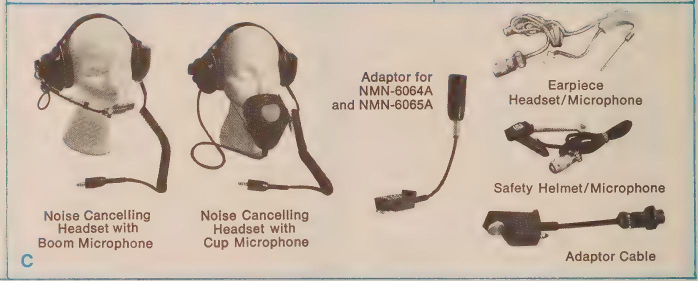
NAD-6212A	136-174 MHz, slimline only.

MT 500 Series Radio


Standard Coil Cord
Standard Straight Cord
Velcro Patch
Special Straight Cord Public Safety
A


Lapel Speaker
Earpiece with Vol. Cont.
Wireless Eyeglass Style Earpiece
Behind-the-ear-style Earpiece
B


Earpiece Speaker/Microphone
D


Noise Cancelling Headset with Boom Microphone
Noise Cancelling Headset with Cup Microphone
Adaptor for NMN-6064A and NMN-6065A
Earpiece Headset/Microphone
Safety Helmet/Microphone
Adaptor Cable
C

Remote Operations Accessories

Speaker/Microphone

A Remote speaker/microphones allow user to talk and listen without removing radio from belt, carrying case or vehicular charger. Ideal in high noise level areas. Separate microphone and speaker unit in same housing provide high quality reception and transmission. Standard cord remote units have back clip for attachment to upper garment. Special cord public safety remote units include antenna connector, high/low audio switch and Velcro backing for secure attachment to Velcro patch pinned to upper garment.

NMN-6082A	with Coil Cord
NMN-6081A	with Straight Cord
NMN-6083A	Public Safety for VHF Only (less antenna)
NLN-8410A	Velcro Patch

Speakers

B Stronger reception in high noise level areas obtained by choice of external speakers. Lapel speaker clips to shirt or collar; uses radio's volume control. Earpiece speaker with volume control worn on ear for maximum private listening; radio speaker disabled with external speaker plugged into radio accessory jack. For maximum comfort, the wireless inductor earpiece speaker may be used in lieu of wired earpiece speaker units. An inductor, included, replaces wired earpiece and excites the wireless earpiece through inductive transmission. (Universal models only for wireless inductor units.)

NSN-6008A	Lapel Speaker
50-83693B04	Earpiece with vol. cont. (replaces NSN-6011).
50-05394E01	Earpiece without vol. cont. (replaces NSN-6028).
NLN-8318A	Wireless behind-the-ear style earpiece. Order battery separately.
NLN-8319A	Wireless eyeglass style earpiece. Order battery separately.
60-05423A01	Battery for NLN-8318A
60-05423A02	Battery for NLN-8319A

Headsets

C Three styles of headsets easily adapt to any hazardous or routine application. A noise cancelling headset eliminates all outside interference in high ambient noise areas. An earpiece headset is offered that lightly but firmly rests on the ear and eliminates the need for a headband. The Safety Helmet/Face Mask headset attaches firmly to a safety helmet or face mask. For face mask operation, the mask microphone adaptor plugs into the acoustic voice tube and mechanically carries the sound from inside the face mask chamber. (Order adaptor separately.) All headset microphone cords attach to the accessory plug in the universal radio only.

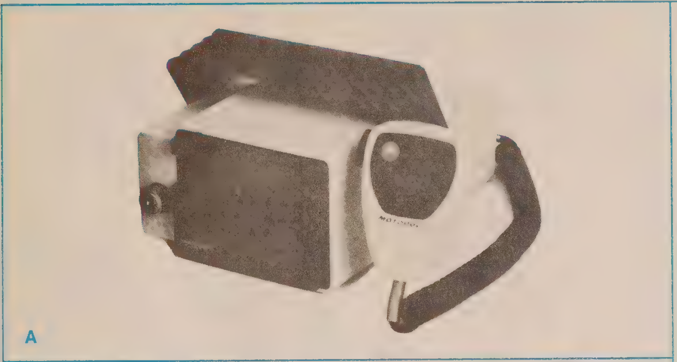
NMN-6064A	Noise cancelling headset/microphone with boom mic. (Order adaptor separately.)
NMN-6065A	Noise cancelling headset/microphone with cup mic. (Order adaptor separately.)
NLN-4477A	Adaptor required for NMN-6064 & 65
50-84972H01	Earpiece headset/microphone (replaces NMN-6056) (Order adaptor separately.)
NLN-4461A	Adaptor required for 50-84972H01 & NMN-6050A.
NMN-6050A	Safety helmet/microphone.
01-84830H01	45° face mask mic. adaptor for NMN-6050A (replaces NLN-6941A).

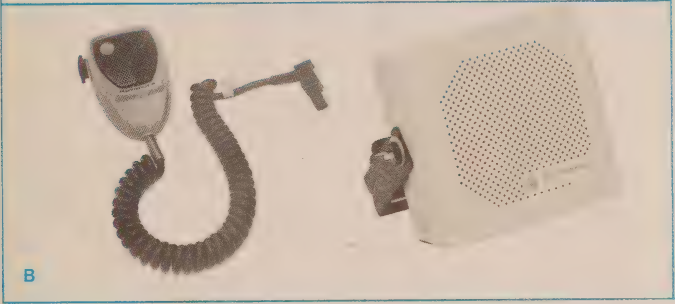
Surveillance Accessory

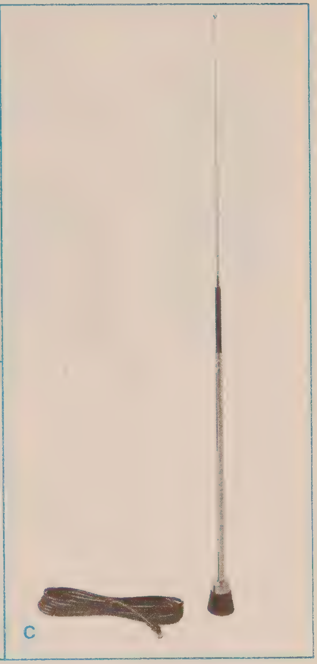
D For unobtrusive communications, the MT 500 radio with various earpiece speakers and microphones provide maximum concealment. An earpiece speaker/miniature microphone/push-to-talk switch unit can be used in lieu of the remote speaker/microphone unit on all universal models. The miniature microphone clips to a lapel or under a tie; the push-to-talk switch can be easily concealed in the palm of the hand with the cord running up the sleeve. Wired earpiece speaker units are available for all models. The flesh colored wired earpiece speaker is available with or without a volume control. For maximum comfort and concealment the wireless inductor earpiece speakers described above under "Speakers" may be used in place of wired earpiece speaker units on universal models.

NMD-6000B	VHF model earpiece speaker/mic/push-to-talk.
NME-6003B	UHF model earpiece speaker/mic/push-to-talk.

MT 500 Series Radio







CONVERTA-COM Radio Mobile Console

A Complete user flexibility is offered by combining your new MT 500 "BBU" Series portable radio with matching radio console. Outside your vehicle, you maintain constant communications using your portable. Inside your vehicle, you obtain true mobile performance by inserting the portable into the mobile console. Automatically, you're connected to a mobile microphone, speaker and antenna. Features of the "Converta-Com" mobile console are:

- Accepts All "BBU" Series Universal Models
- Fast, 3-Hour Charge Rate
- Charge/Transmit Indicator Light
- Optional 12 Watts Audio
- Key Lock
- Ignition Switch Interlock
- Front Panel/Control Illumination
- Tamper-Resistant Universal Mounting
- Dead Battery Radio Operation
- Rugged Construction

NLN-4470A	**Console Kit: Order DC power cable, microphone, speaker and antenna separately.**
NLN-6226A	**Cable Kit: This kit is used to bring DC power from the vehicle to the console.**

CONVERTA-COM Console Accessories

B Mobile microphone and speaker exhibit same high quality performance found in other Motorola mobile radios. Palm-type microphone with coil cord and push-to-talk switch improves fidelity over integral radio microphone. Built-in transistorized pre-amplifier reduces spray pick-up. Separate speaker/cable kit provides improved audio quality and intelligibility over integral speaker. Universal mounting bracket supplied for versatile mounting. Hang-up clip on rear of speaker permits temporary hanging of speaker on door window for improved monitoring outside vehicle. "Converta-Com" consoles equipped with the external audio speaker option operate in the same manner as the standard "Converta-Com" console except the radio volume control is disabled and volume is adjusted by the console volume control. Integral microphone and speaker automatically circumvented when portable unit inserted into console.

TMN-6054A	**Dynamic microphone**
NSN-6029A	**½ watt speaker**
NSN-6027A	**12 watt speaker**

Unit ID Adaptor

C The unit ID MT 500 has a larger housing and the "Converta-Com" requires a larger pocket to accept this radio.

NLN-4781A	**Unit ID pocket**

Mobile Antenna for Use with CONVERTA-COM Console

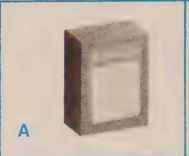
High Band ¼ Wave Rooftop Antenna

TAD-6111A	**136 to 144 MHz**
TAD-6112A	**144 to 152 MHz**
TAD-6113A	**152 to 162 MHz**
TAD-6114A	**162 to 174 MHz**

UHF 5db Gain Antenna

TAE-6061B	**403 to 430 MHz**
TAE-6062B	**450 to 470 MHz**
TAE-6064B	**470 to 494 MHz**
TAE-6065B	**494 to 512 MHz**

HT-100 and HT-220 Series Accessories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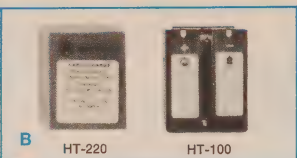
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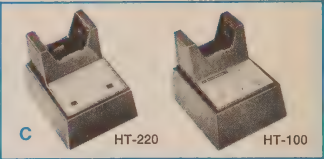
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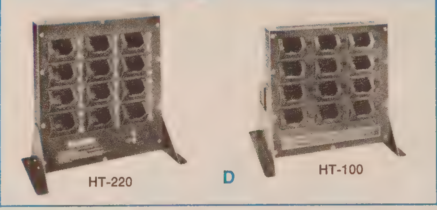
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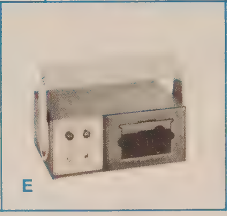
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F

Batteries

Mercury

A Mercury batteries are ideal for extended use away from centralized facilities. Typically provides 30-40 hours of operation. RF output power reduced by one-half.

60-83582H01	Slimline (Replaces NLN-6683A)
60-84342H01	Omni, low power (Replaces NLN-6762A)
60-84815H01	Omni, high power (Replaces NLN-6936A)

Nickel-Cadmium

B Rechargeable nickel-cadmium batteries offer most economical operation when use time is predictable or for multi-shift operations using spare batteries. Typically provides 8 hours' operation per 16-hour charge (standard charge battery) or 1-hour charge (rapid charge battery). Provides full rated RF output power. HT-100 rechargeable nicad battery forms part of back cover.

60-84643H01	HT-220 Slimline, standard charge (Replaces NLN-6682A)
60-84641H01	HT-220 Slimline, rapid charge (Replaces NLN-6899A)
60-84642H01	HT-220 Omni, standard charge (Replaces NLN-6761A)
60-84636H01	HT-220 Omni, rapid charge (Replaces NLN-6900A)
60-5295A03	HT-220 Omni, standard charge intrinsically safe (Replaces NLN-8232B)
60-84184H02	HT-100 All models (Replaces NLN-6781B)

Battery Chargers

Single Unit

C Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges battery in or out of radio. Radio operates during charge. Switchable trickle or full-charge rate. Automatically reverts to trickle rate when fully charged. Rapid-charge battery must be used in rapid-charge charger to attain rapid charge rate.

NLN-6684A	HT-220 Slimline, standard charge, 117 VAC
NLN-6993A	HT-220 Slimline, standard charge, 220 VAC 50/60 Hz
NLN-6895A	HT-220 Slimline, rapid charge, 117 VAC
NLN-6995A	HT-220 Slimline, rapid charge, 220 VAC 50/60 Hz
NLN-6804A	HT-220 Omni, standard charge, 117 VAC
NLN-6997A	HT-220 Omni, standard charge, 220 VAC 50/60 Hz
NLN-6897A	HT-220 Omni, rapid charge, 117 VAC
NLN-6999A	HT-220 Omni, rapid charge, 220 VAC 50/60 Hz
NLN-6806B	HT-100 Standard charge, 117 VAC

Multiple Unit

D Multiple unit charger designed for large system users or multi-shift operations requiring spare batteries. Can be wall-mounted. Accommodates up to 12 radios or batteries. Other features same as single unit.

NLN-6685A	HT-220 Slimline, standard charge, 117 VAC
NLN-6994A	HT-220 Slimline, standard charge, 220 VAC 50/60 Hz
NLN-6896B	HT-220 Slimline, rapid charge, 117 VAC
NLN-6996A	HT-220 Slimline, rapid charge, 220 VAC 50/60 Hz
NLN-6756A	HT-220 Omni, standard charge, 117 VAC
NLN-6998A	HT-220 Omni, standard charge, 220 VAC 50/60 Hz
NLN-6898B	HT-220 Omni, rapid charge, 117 VAC
NLN-8000A	HT-220 Omni, rapid charge, 220 VAC 50/60 Hz
NLN-6807B	HT-100 Standard charge, 117 VAC

Vehicular

E Vehicular charger mounts under dash. Other features same as single unit except no rapid-charge capability. Battery power cable kits permit 6 to 12-volt operation. (Order separately.) 24 VDC operation available on special order only. For greater range, connect mobile antenna to rear of charger. Antenna adapter cable kit must be used to connect antenna on radio to antenna jack on charger during mobile antenna operation. (Order separately.)

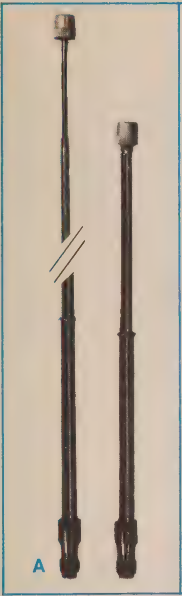
NLN-6691A	Slimline, standard charge, 6/12 VDC
NLN-6892A	Omni, standard charge, 6/12 VDC
NKN-6149A	Power Cable Kit (6V)
NKN-6150A	Power Cable Kit (12V)
NKN-6151A	Power Cable Kit (12V) cigar lighter adapter
NKD-6006A	Antenna Adapter Cable Kit for operating radio from charger (VHF) 136-174 MHz
NKE-6008A	Antenna Adapter Cable Kit for operating radio from charger (UHF) 406-512 MHz

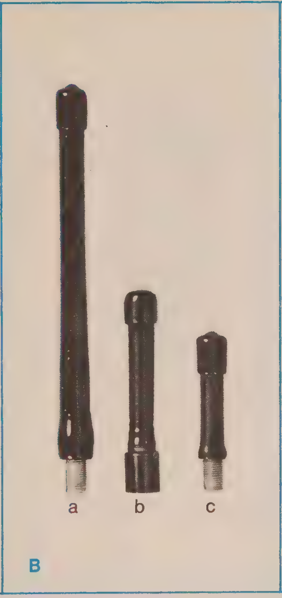
Adaptors

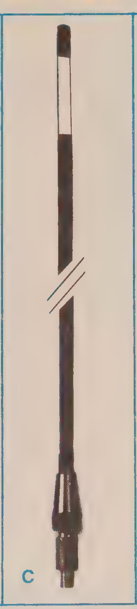
F A variety of adaptors allow older HT-200 radio chargers to be used for newer HT-220 standard charge batteries or HT-220 chargers to be used for HT-100 battery.

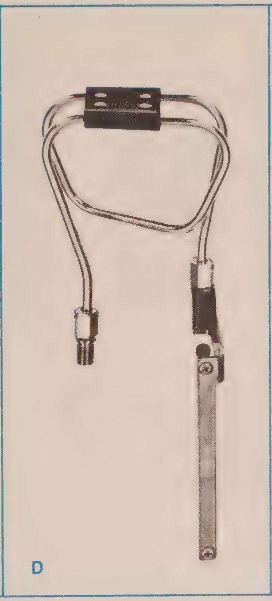
NLN-6775B	Modifies HT-220 single or multiple unit chargers to accept HT-100 radio or NLN-6781 battery
NLN-6774A	Modifies HT-200 single or multiple unit chargers to accept HT-220 Slimline radio or NLN-6682A battery
NLN-6776A	Modifies HT-200 single or multiple unit chargers to accept HT-220 Omni radios or NLN-6761A battery

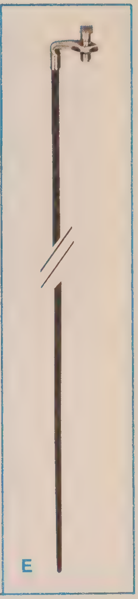
HT Series Accessories Antennas











Collapsible Antenna

A Collapsible antennas provide protection from damage when radio's not in use. Extends well above body-shielding effects for excellent reception and transmission. Number of sections determine height.

85-5762A01	136-162 MHz; 6 section (Replaces NAD-6262A)
85-84226H01	162-174 MHz; 5 section (Replaces NAD-6211A)
85-84226H02	150.8-174 MHz; 5 section (Replaces NAD-6217A) (HT-100 only)
85-84390H02	406-512 MHz; 2 section (Replaces NAE-6090A)

Heliflex Antenna

B Heliflex antennas are short and flexible. Especially practical where obstacles are present. Provides good reception and transmission. Letter-stamped for identification.

85-82283J05	136-142 MHz (Replaces NAD-6221A) Stamped A Fig. (a)
85-82283J06	142-150.8 MHz (Replaces NAD-6222A) Stamped B Fig. (a)
85-82283J01	150.8-162 MHz (Replaces NAD-6219A) Stamped C Fig. (a)
85-82283J02	162-174 MHz (Replaces NAD-6220A) Stamped D Fig. (a)
NAE-6132A	450-470 MHz (Public Safety Radio Only) Fig. (b)
NAE-6100B	406-420 MHz Stamped U Fig. (c)
NAE-6142B	450-470 MHz Stamped S Fig. (c)
NAE-6163A	470-512 MHz Stamped E Fig. (c)

Flexible Whip Antenna

C Flexible Whip antenna provides protection when radio's used near obstacles. Snaps back to upright position. Extends well above body-shielding effects for excellent reception and transmission.

NAE-6050B 406-420 & 450-512 MHz

Rigid Loop Antenna

D Rigid Loop antennas designed for rugged industrial or railroad use. Permanently attached. Limited range.

NAD-6213A 150.8-174 MHz }
NAD-6215B 150.8-174 MHz } See chart below

Dribble Antenna

E Dribble antenna recommended for chest pack use or where extended antenna may be hazardous or undesirable. Hangs down out of way. Limited range.

NAD-6212A 136-174 MHz

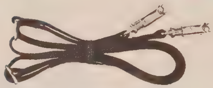
Antenna Compatibility Chart

Antenna Model No.	HT-220 MODELS						HT-100 Models
	All Std. Models		Special Slimline	Public Safety	Marine	"Handie-Phone"	
	Slimline	Omni					
NAD-6211	●	●	●		●	●	
NAD-6212	●						
NAD-6213	●						
NAD-6215		●			●	●	
NAD-6217							●
NAD-6219	●	●	●		●	●	●
NAD-6220	●	●	●		●	●	●
NAD-6221	●	●	●			●	
NAD-6222	●	●	●			●	
NAD-6262	●	●	●		●	●	
NAE-6050	●	●				●	●
NAE-6090	●	●				●	●
NAE-6100	●	●					
NAE-6142	●	●				●	●
NAE-6163	●	●					
NAE-6132				●			

HT-100 & HT-220 Series Accessories

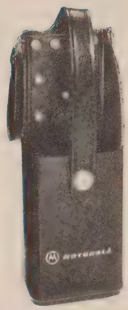
Standard Carrying Case with Full-Cover

Standard Carrying Case with T-Strap Cover



Carrying Strap, all models (Replaces NLN-6349)

A



Swivel Carrying Case with T-Strap Cover and Belt Loop Attachment

Swivel Carrying Case with Full-Cover and Belt Loop Attachment

B

Standard Carrying Case

A Standard carrying cases with snap-on/off perforated full covers provide maximum protection, yet permit audio to be heard clearly. T-strap covers permit easy access to all controls. (Radios with rigid loop antenna must use T-strap cover.) Sturdy black leather. Heavy-duty snaps on integral belt loop permit quick attachment and release. For over-the-shoulder carry, the adjustable sturdy black nylon carrying strap is recommended.

NLN-6686A	Slimline C.S. Full Cover
NLN-6738A	Slimline P-L. Full Cover
NLN-6777A	Omni C.S. Full Cover
NLN-6778A	Omni P-L. Full Cover
15-84560H01	HT-100 only (Replaces NLN-6779A).
NLN-6803A	Slimline C.S. T-Strap Cover
NLN-6844A	Slimline P-L. T-Strap Cover
NLN-6845A	Omni C.S. T-Strap Cover
NLN-6846A	Omni P-L. T-Strap Cover
15-82536J01	Case only, Slimline C.S.
15-82536J02	Case only, Slimline P-L
15-82537J01	Case only, Omni C.S.
15-82537J02	Case only, Omni P-L
42-82534J01	T-Strap Cover only
15-82535J02	Full Cover only
42-82608H01	Carrying Strap, all models (Replaces NLN-6349)

Swivel Carrying Case

B Swivel carrying cases are riveted to belt loop attachment. Radio swings freely on belt loop attachment, adjusting to body movements walking or sitting. Riveted belt loop attachment fits belts up to 2½ inches and has heavy-duty snaps for easy on-off access.

NLN-8674A	Slimline C.S. Full Cover
NLN-8675A	Slimline P-L. Full Cover
NLN-8676A	Omni C.S. Full Cover
NLN-8677A	Omni P-L. Full Cover
15-82535J02	Full Cover only
NLN-8678A	Slimline C.S. T-Strap Cover
NLN-8679A	Slimline P-L. T-Strap Cover
NLN-8680A	Omni C.S. T-Strap Cover
NLN-8681A	Omni P-L. T-Strap Cover
42-82534J01	T-Strap Cover only

Carrying Case Compatibility Chart

Carrying Case Model No.	HT-220 Series																HT-100 Series
	Basic Model				Remote Model				Universal Model		Selective Call Model		Public Safety Model		Marine Model	"Handie Phone" Model	
	Slimline		Omni		Slimline		Omni										
	C.S.	P-L	C.S.	P-L	C.S.	P-L	C.S.	P-L	C.S.	P-L	C.S.	P-L	Slimline	Omni			
NLN-6686	●																
NLN-6738		●															
NLN-6777			1														
NLN-6778				●											●	●	
NLN-6779																	●
NLN-6803					●												
NLN-6844						●											
NLN-6845							●		2		3						
NLN-6846								●		●		4					
NLN-8674A	●																
NLN-8675A		●											●				
NLN-8676A			1														
NLN-8677A				●										●			
NLN-8678A					●												
NLN-8679A						●							●				
NLN-8680A							●		2		3						
NLN-8681A								●		●		4		●			

[1] For 5 and 6 frequency, high power, UHF basic models, use NLN-6778 or NLN-8677.

[2] For high power, UHF, universal models, use NLN-6846 or NLN-8681.

[3] For VHF units without remote speaker/microphone, use NLN-6777 or NLN-8676.

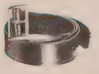
[4] For VHF units without remote speaker/microphones, use NLN-6778 or NLN-8677.

C.S. = Carrier Squelch P-L = "Prviate-Line" Squelch

Back Cover with Belt Clip

Lavaliere and Safety Lanyard

A



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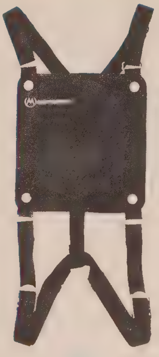

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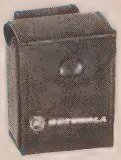

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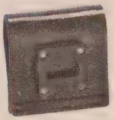


E

Back Cover with Belt Clip

A Radio can be worn on belt without carrying case by replacing conventional back cover on radio with a back cover having a permanent belt clip. For over-the-shoulder carry, the lavaliere and adjustable safety lanyard are recommended.

NLN-6675A	Slimline, carrier squelch, back cover
NLN-6679A	Slimline, "Private-Line", back cover
NLN-8423A	Omni, carrier squelch, back cover
NLN-8424A	Omni, "Private-Line", back cover
NLN-6886C	Universal model, carrier squelch, back cover
NLN-6887C	Universal model, "Private-Line", back cover
NLN-6812A	HT-100 only, back cover
NLN-6687A	Slimline Lavaliere and Safety Lanyard
NLN-6780A	Omni Lavaliere and Safety Lanyard
NLN-6796A	HT-100 only, Lavaliere and Safety Lanyard

Belt

B Adjustable matching black belt recommended for all carrying cases and belt clips.

42-865599	Belt—All models (Replaces NLN-6042A)

Chest Pack

C Chest pack keeps radio on chest for maximum hands-free operation. Ideal where body movements might expose radio to damage or hazardous conditions. Safety "break-away" straps go over shoulder and around waist.

42-84117H01	HT-220 only (Replaces NLN-6731A)

Carrying Case for Spare Battery

D Don't get caught with a dead battery—carry a spare.

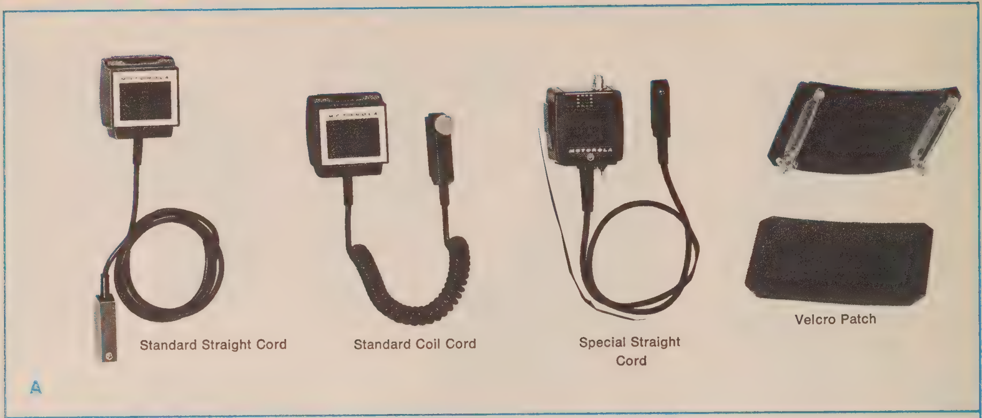
15-84122H01	Slimline only (Replaces NLN-6795A)

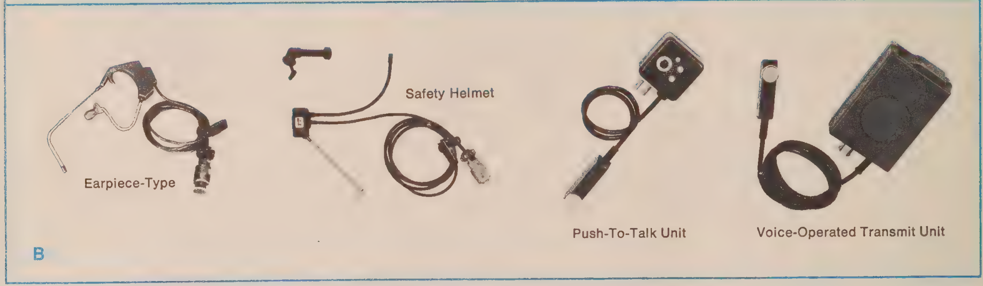
Belt Loop Attachment

E Belt loop attachment for older swivel carrying cases. NLN-8241 thru NLN-8244 and NLN-8254 thru NLN-8257.

42-82421J06

Remote Operation Accessories





Speaker/Microphones

A Remote speaker/microphones allow user to talk and listen without removing radio from belt, carrying case or vehicular charger. Ideal in high noise level areas. Separate microphone and speaker units in same housing provide high quality reception and transmission. Standard cord remote units have back clip for attachment to upper garment. Special cord remote units include antenna connector, high/low audio switch and Velcro backing for secure attachment to Velcro patch pinned to upper garment.

NMN-6041C	Standard Straight Cord, Remote model
NMN-6048C	Standard Straight Cord, Universal model
NMN-6042C	Standard Coil Cord, Remote model
NMN-6049C	Standard Coil Cord, Universal model
NMN-6060C	Special Straight Cord, Flexible cord, Remote and Public Safety models
NMN-6061B	Special Straight Cord, Armored cord, Remote and Public Safety models
NLN-8410A	Velcro Patch

Headsets

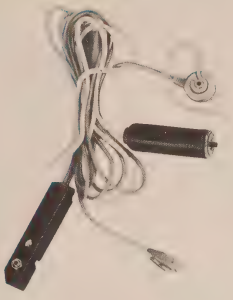
B Two styles of headsets adapt to any hazardous or routine job. Earpiece headset rests lightly but firmly on ear and eliminates need for headband. Safety helmet headset attaches to safety helmet. All headset microphone cords attach to push-to-talk unit connected to accessory plug on radio. (Order P-T-T unit separately.) On VHF Universal models only, a voice-operated transmit unit is available in place of the P-T-T unit; permits automatic voice-keying of transmitter as well as manual P-T-T. (Order VOX unit separately.)

50-84972H01	Earpiece-Type, Remote or Universal model (Replaces NMN-6056A) Order PTT unit separately.
NMN-6050A	Safety Helmet/Face Mask, Remote or Universal model. Order PTT unit separately
NLN-6808A	Push-To-Talk Unit, Remote model
NLN-6889A	Push-To-Talk Unit, Universal model
NLN-8567A	Voice-Operated Transmit Unit, VHF, Universal model (Replaces ZLN-6120A)

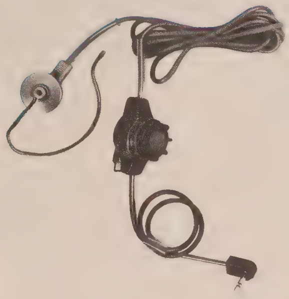
SPECIFICATIONS

Helmet Headset NMN-6050A
Earpiece Headset NMN-6056A

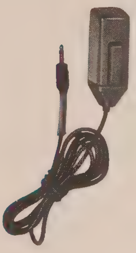
Microphone: **Impedance:** 3000 ohms at 1 kHz. **Output:** —59 dBm for 98 dB Sound Power Level (ref. 0.0002 dynes/cm² excitation). *Earphone:* **Impedance:** 300 ohms at 1 kHz for —10 dBm excitation.



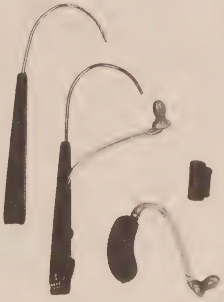
Earpiece Speaker/Microphone/Push-to-Talk Assembly



Wired Earpiece Speaker/Volume Control Unit



Palm-Type Microphone



Wireless Earpiece Speaker/Inductor

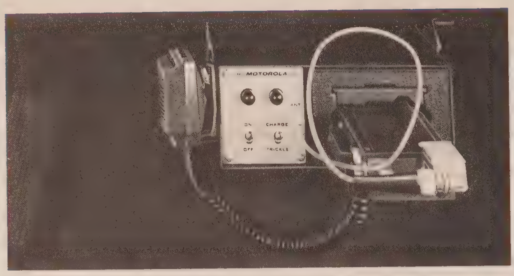
C

Earpiece Speakers and Microphones

C For unobtrusive communications, various earpiece speakers and microphones provide maximum concealment. An earpiece speaker/miniature microphone/push-to-talk switch assembly can be used in lieu of the remote speaker/microphone on all Remote models. Flesh-colored wired earpiece speaker has own volume control. Miniature microphone clips to lapel or under tie. Push-to-talk switch easily concealed in palm of hand with cord run up sleeve. Separate palm-type microphone and wired earpiece speaker are available for Special Slimline model only. Wireless earpiece speaker can be used in lieu of wired earpieces for maximum comfort. An inductor replaces wired earpiece and, through inductive transmission, excites the wireless earpiece.

50-83693B04	Wired Earpiece Speaker/Volume Control Unit, Special Slimline model (Replaces NSN-6011A)
ZMN-6014B	Earpiece Speaker/Microphone/Push-to-Talk Assembly, Remote model
ZMN-6021A	Palm-Type Microphone, Special Slimline model
NLN-8318A	Wireless Earpiece Speaker/Inductor, Behind-the-ear style, order battery separately
NLN-8319A	Wireless Earpiece Speaker/Inductor, Eyeglass style, order battery separately
60-5423A01	Battery for NLN-8318A
60-5423A02	Battery for NLN-8319A

Mobile Operation and Noise Cancelling Accessories



A

B

Headset w/Boom Microphone
Headset w/Cup Microphone Adapter Cables
Adapter Cables

C

HT Series Mobile Operation

A When operating your portable inside a vehicle, extended range is obtained by using a mobile antenna. Two methods of mobile antenna connection are available. The vehicular charger can be connected to a mobile antenna for operation with either Remote or Universal models. A second method is to connect any model radio directly to the mobile antenna whenever you enter the vehicle. The vehicular antenna adapter kit contains all cables and connectors necessary for this type of operation. Radio can be left in carrying case, placed on seat or above sun visor. See antenna pages for mobile antenna information.

NLN-6691A	Slimline Vehicular Charger
NLN-6892A	Omni Vehicular Charger
NKD-6000B	VHF Vehicular Antenna Adapter Kit
NKE-6004A	UHF Vehicular Antenna Adapter Kit

"CONVERTA-COM" Console Accessories

B Mobile microphone and speaker exhibit same high quality performance found in other Motorola mobile radios. Palm-type microphone with coil cord and push-to-talk switch improves fidelity over integral radio microphone. Built-in transistorized pre-amplifier reduces spray pickup. Separate speaker/cable kit provides improved audio quality and intelligibility over integral radio speaker. Universal mounting bracket supplied for versatile mounting. Hang-up clip on rear of speaker permits temporary hanging of speaker on door window for improved monitoring outside vehicle. Integral microphone and speaker automatically circumvented when portable unit inserted into console.

ZMN-6022A	Mobile Microphone
ZSN-6006A	Mobile Speaker/Cable Kit

Noise Cancelling Accessories for HANDIE-TALKIE HT-220 Remote and Universal Model and HANDIE-COM Two-Way Radios

C Now you can maintain portable two-way communications in high ambient noise areas with Motorola noise cancelling accessories.

Headset model NMN-6064 includes two speaker ear muffs with adjustable boom microphone for use in moderate to high noise environments. For noise areas above 120 dB, model NMN-6065 is offered. This model comes with two speaker ear muffs and a shielded cup microphone. Both of these weatherproof models can be worn with or without a safety type helmet. Adaptor cable required for connecting to radio.

NMN-6064A	Headset w/Boom Microphone
NMN-6065A	Headset w/Cup Microphone
NKN-6189A	Adapter Cable for HT-220 Universal models, 12″ (305 mm)
NKN-6190A	Adapter Cable for HT-220 Remote models, 12″ (305 mm)
NKN-6192A	Adapter Cable for Handie-Com radios

SPECIFICATIONS

NMN-6064 Headset with Boom Microphone.

Weight: Approximately 21 oz. (653g). **Color:** Black. **Coiled Cord Length:** Retracted—11½″ (292mm), Extended—23″ (584mm). **Headset Characteristics:** Noise capability up to 120 dB. **Microphone Characteristics:** Response: 300-4000 Hz. Output: −74 dBm (0dBm equals 1 mW/10 dynes per square centimeter at ¼ inch). Impedance: 5 ohms nominal.

NMN-6065 Headset with Cup Microphone.

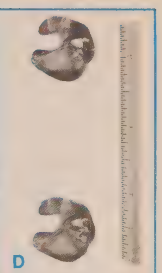
Weight: Approximately 26 oz. (809g). **Color:** Black. **Coiled Cord Length:** Retracted—11½″ (292mm), Extended—23″ (584mm). **Headset Characteristics:** Noise capability up to 140 dB. **Microphone Characteristics:** Response: 200-4000 Hz. Output: −70 dBm (0dBm equals 1 mW/10 dynes per square centimeter at ¼ inch). Impedance: 5 ohms nominal.

HANDIE-COM Series Accessories

A

B

C



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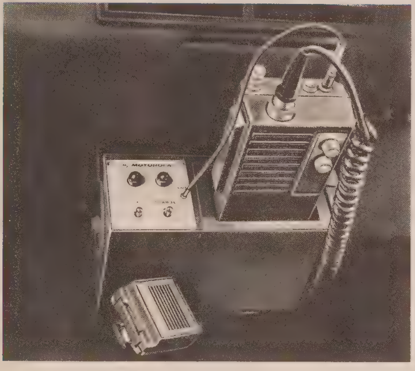
E



Vehicular Charger

Vehicular Antenna Adapter Kit

Remote Operation Accessories

Speaker/Microphone

A Remote speaker/microphone with push-to-talk switch allows user to talk and listen without removing radio from carrying case or vehicular charger. Ideal in high noise level areas. Separate microphone and speaker units in same housing provide high quality reception and transmission. Remote unit clips to upper garment.

NMN-6059B	Universal models

External Microphone

B External microphone with push-to-talk switch permits transmission without removing radio from carrying case or vehicular charger. Reception is through normal radio speaker. Remote unit has Velcro backing and attaches to Velcro patch pinned to upper garment.

NMN-6055B	Universal models
NLN-8410A	Velcro Patch

Speakers

C Stronger reception in high noise level areas obtained by choice of external speakers. Lapel speaker clips to shirt or collar; uses radio's volume control. Earpiece speaker with volume control worn on ear for maximum private listening; radio speaker disabled with external speaker plugged into radio accessory jack.

NSN-6006A	Lapel Speaker
50-83693B04	Earpiece Speaker/Volume Control (Replaces NSN-6011A)

Ear Mold Kits

D Ear mold kits insert into ear to baffle outside noises, providing clearest reception under extremely high noise levels. Plastic conforms to contour of ear.

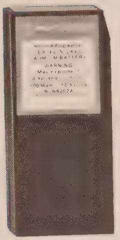
50-83851B01	Right Ear
50-83851B02	Left Ear

Vehicular Charger and Antenna Adapter Kits

E When operating your portable inside a vehicle, extended range is obtained by using a mobile antenna. Two methods of mobile antenna connection are available. The vehicular charger can be connected to a mobile antenna for operation with Universal models. Alternately, any model radio may be connected directly to the mobile antenna whenever you enter the vehicle. The vehicular antenna adapter kit contains all cables and connectors necessary for connection between mobile antenna and external antenna jack on radio. Radio can be left in carrying case, placed on seat or above sun visor. See antenna pages for mobile antenna information.

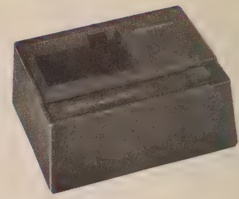
NLN-8460A	Vehicular Charger, Universal models
NKN-6065A	Vehicular Antenna Adapter Kit All models

HANDIE-COM Series Accessories



A

B



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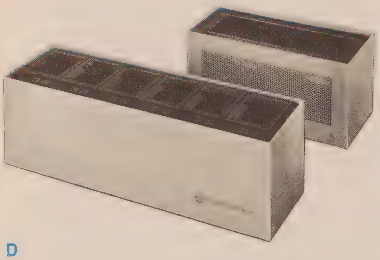

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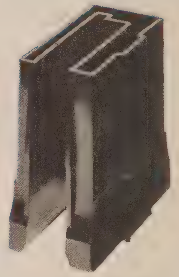


F

Batteries

Nickel-Cadmium

A Rechargeable nicad batteries offer most economical operation when use time is predictable or for multi-shift operations using spare batteries. Typically provides 8 hours' operation per 16-hour charge (standard charge battery) or 1-hour charge (rapid charge battery).

60-82324J01	Standard charge (Replaces NLN-8002A)
60-82387J01	Rapid charge (Replaces NLN-8096A)

Mercury and Alkaline

B Mercury and alkaline batteries are ideal for extended use away from centralized facilities. Mercury-type typically provides 40 hours of operation. Alkaline-type provides somewhat less than mercury. RF power output reduced with mercury or alkaline batteries.

60-82325J01	Mercury sealed package (Replaces NLN-8095)
60-84306A65	"AA" mercury cell for NLN-8106A (Replaces NLN-8104A and 60-82357J01) (order 10)
60-83062J01	Alkaline sealed package (Replaces NLN-8470A)
60-82389J01	10 "AA" alkaline cells for NLN-8106 (Replaces NLN-8105A)
NLN-8106A	Holder for "AA" cells

Battery Chargers

Single Unit

C Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges battery in or out of radio. Radio operates during charge. Automatically reverts to trickle charge when battery reaches full charge. Any battery usable in any charger, but rapid-charge battery must be used in rapid-charge charger to attain rapid charge rate.

NLN-8005A	Standard charge, 110 VAC
NLN-8464A	Standard charge, 220 VAC
NLN-8004A	Rapid charge, 110 VAC
NLN-8465A	Rapid charge, 220 VAC

Multiple Unit

D Multiple unit charger designed for large system users or multi-shift operations requiring spare batteries. Accommodates up to 6 radios or batteries. For rapid-charger, order proper power supply separately. (One power supply powers up to two multiple-unit chargers.) Other features same as single unit.

NLN-8205A	Standard charge, 110 VAC
NLN-8466A	Standard charge, 220 VAC
NLN-8206A	Rapid charge, (Requires Rapid charge power supply)
NLN-8207A	110 VAC Rapid Charge Power Supply
NPN-6055A	220 VAC Rapid Charge Power Supply

Vehicular

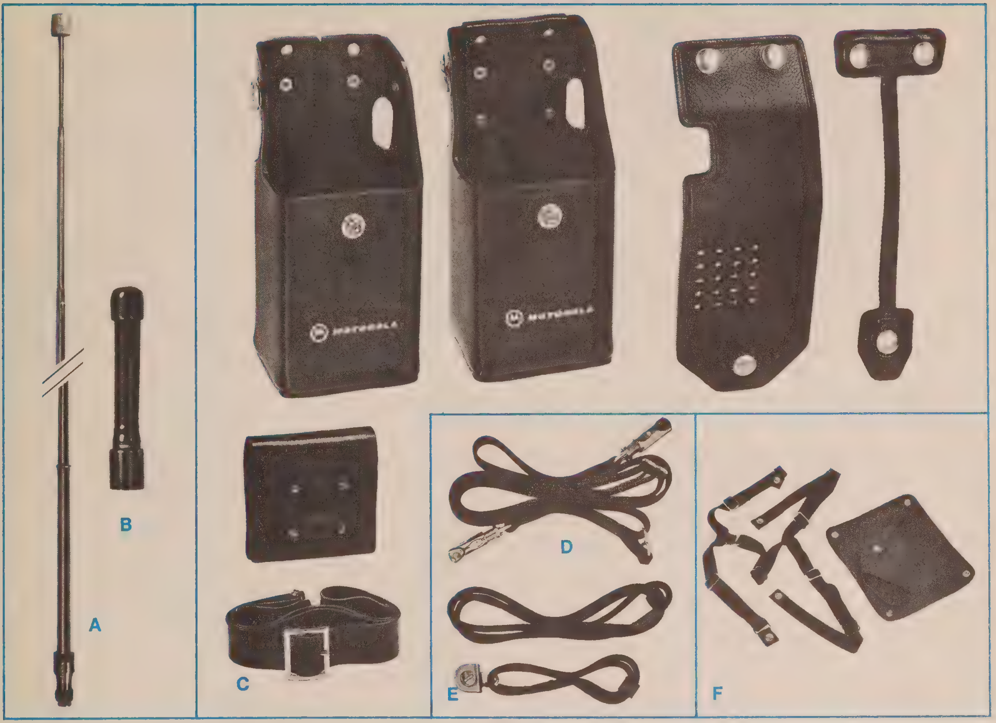
E Vehicular charger mounts under dash. Other features same as single unit except no rapid-charge capability. Battery power cable kits permit 6 to 12-volt operation. (Order separately.) 24 VDC operation available on special order only. For greater range, connect mobile antenna to rear of charger. Antenna adapter cable kit must be used to connect antenna on radio to antenna jack on charger during mobile antenna operation. (Order separately.)

NLN-8460A	Standard charge vehicular charger 6/12 VDC
NKN-6149A	(6V) Power Cable Kit
NKN-6150A	(12V) Power Cable Kit
NKN-6151A	(12V, cigar lighter adapter)
NKD-6006A	Antenna to charger Adapter Cable Kit for operating radio from mobile antenna.

Charger Pocket Insert

F Charger pocket insert modifies HT-200 chargers (NLN-6259 and NLN-6260) to accommodate NLN-8002 nickel-cadmium battery.

43-5306B01	HT-200 to HANDIE-COM adapter (Replaces ZLN-6288A)



Antennas

Collapsible

A Collapsible antennas provide protection from damage when radio's not in use. Extends well above body-shielding effects for excellent reception and transmission.

85-82326J01	(30-50 MHz) (Replaces NAB-6210)
85-5762A01	(150.8-162 MHz) (Replaces NAD-6262A)
85-84226H01	(162-174 MHz) (Replaces NAD-6211)

Heliflex

B Heliflex antennas are short and flexible. Especially practical where obstacles are present. Provides good reception and transmission.

85-84221H08	(30-50 MHz) (Replaces NAB-6225A)
85-82283J01	(150.8-162 MHz) (Replaces NAD-6219)
85-82283J02	(162-174 MHz) (Replaces NAD-6220A)

Carrying Cases and Belt

C Sturdy black leather carrying case. Standard case has heavy-duty snaps on integral belt loop for quick attachment and release. Swivel case attaches to belt loop attachment by inverting radio. Radio adjusts to body movements walking or sitting. Sewn belt loop attachment fits belts up to 2½ inches. Snap on/off perforated full cover provides maximum protection, yet permits audio to be heard clearly. T-strap cover permits easy access to all controls. Adjustable matching black belt recommended for all carrying cases.

15-5778B01	Standard Carrying Case (Replaces NLN-8018B)
NLN-8471B	Swivel Carrying Case
42-82421J05	Belt Loop Attachment for belts up to 2½″ in width (Replaces ZLN-6205)
42-5857B01	Belt loop attachment for belts up to 3¼″ in width
15-82501J01	Full cover, Standard model (Replaces NLN-8006)
15-82501J02	Full cover, Universal model (Replaces NLN-8003)
42-83059J01	T-strap cover, all models (Replaces NLN-8472A)
42-865599	Belt (Replaces NLN-6042)

Carrying Strap

D For over-the-shoulder carry, a tough nylon swivel-type carrying strap is available. Adjustable straps fasten to sides of carrying case.

42-82608H01 (Replaces NLN-6349A)

Lavaliere and Safety Lanyard

E Lavaliere and safety lanyard permits over-the-shoulder carry without need for carrying case. Lavaliere fastens to radio backplate and attaches to adjustable safety lanyard.

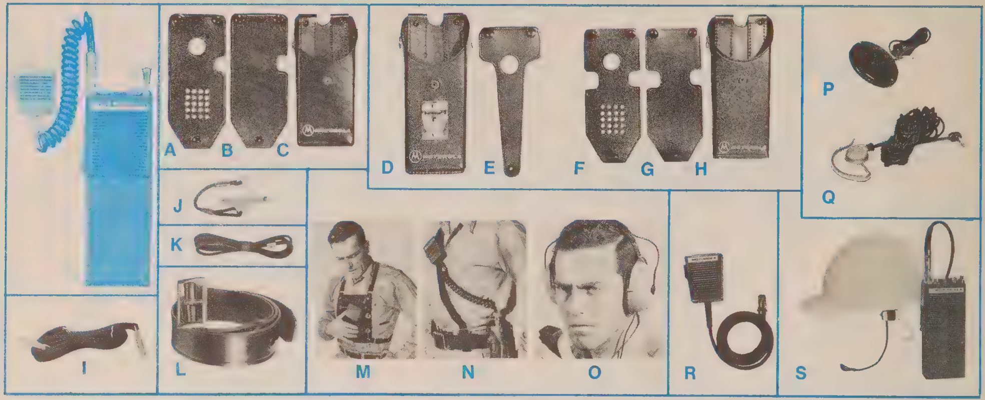
NLN-8007A

Chest Pack

F Chest pack keeps radio on chest for maximum hands-free operation. Ideal where body movements might expose radio to damage or hazardous conditions. Safety "break-away" straps go over shoulder and around waist.

NLN-8498 Chest Pack

HT-200 Series Accessories



Carrying Cases and Covers

RADIO TYPE	CARRYING CASE	FIG.	COVER PLAIN	FIG.	COVER PERF.	FIG.
STANDARD w/internal mike	**15-82909G01** (replaces NLN-6316A)	C	**15-82911G01** (replaces NLN-6318A)	B	**15-82912G01** (replaces NLN-6320A)	A
UNIVERSAL w/int./ext. mike & Mike Clip	**15-82909G05** (replaces NLN-6343A)	D	**15-82910G01** (replaces NLN-6322A)	E	**15-82405H01** (replaces NLN-6340A)	F
SELECTIVE CALL	**15-82909G03** (replaces NLN-6332A)	H	**15-82406H01** (replaces NLN-6341A)	G	**15-82405H01** (replaces NLN-6340A)	F
RIGID LOOP	**15-82909G01** (replaces NLN-6316A)	C	**15-82910G01** (replaces NLN-6322A)	E	—	—

Carrying Accessories*

Safety lanyard, carrying strap, lavaliere kit, belts and chest pack add flexibility to portable radio operation . . . leave the hands free . . . prevent dropping. Lavaliere kit used alone or with lanyard or carrying strap screws securely to back of radio.

I Carrying Strap (replaces NLN-6349A).
42-82608H01

J & K Lavaliere and Safety Lanyard.
NLN-6451A

J & I Lavaliere and Carrying Strap.
NLN-6450A

K Lanyard only.
42-82607H01

L Belt, adjustable (replaces NLN-6042A).
42-865599

M Chest Pack, Black (replaces NLN-6353A).
42-82912H01

M Chest Pack, Safety Orange (replaces NLN-6449A).
42-82912H02

N Belt, Sam Browne
NLN-6352A

Ear Mold Kits

Insert into ear to baffle outside noises, providing clearest reception under extremely high noise levels. Plastic conforms to contour of ear.

50-83851B01	Ear Mold Kit, left ear (replaces NLN-6391A).
50-83851B02	Ear Mold Kit, right ear (replaces NLN-6392A)

Aircraft Type Headset

O For use with Universal model radios in areas with extremely high noise levels. Fits snugly over both ears. Speakers in each ear piece.

NSN-6012A Headset

Speakers

P Lapel Speaker with miniature phone plug for H21, H23 DCN.

NSN-6008A Lapel Speaker

Q Ear Piece with volume control and miniature phone plug.

50-83693B04 (replaces NSN-6011A)

Microphones

R A complete complement of microphones and speaker-microphones with both straight and coil cords are listed below.

NMN-6040A	Speaker and Microphone, Coil Cord
NMN-6039A**	Speaker and Microphone, Straight Cord
NMN-6023B	Microphone, Coil Cord
NMN-6024B**	Microphone, Straight Cord
NMN-6026A	Microphone. Palm Type with Push To Talk Control and Up Arm Antenna (for 132-174 MC only)
NMN-6027B**	Noise Cancelling Microphone, Straight Cord
NMN-6028B	Noise Cancelling Microphone, Coil Cord

Safety Helmet and Hard Hat Headset and Microphone Units

Hard hat not supplied.

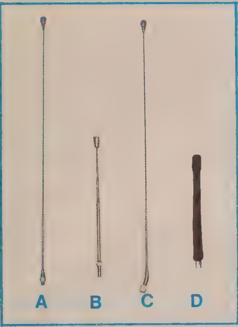
S Safety helmet and hard hat headset and microphone units fit all standard helmets and hard hats. Includes an assortment of ear plugs. Hard hat not supplied.

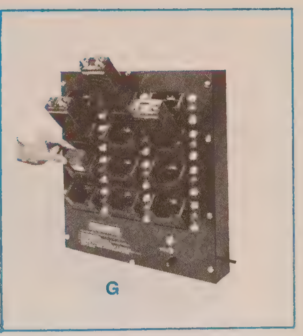
NMN-6029A	Headset and microphone only.
NMN-6037A	Same as above, but with push-to-talk button and volume control.
58-83985E01	Noise reducing adapter for use with NMN-6029A and NMN-6037A (replaces NLN-6630A).

***Available in black only, except for orange chest pack.**

****With antenna in cord. Antenna operable in 132-174 MC band only.**

HT 200 Series Radio





Standard Antennas

	A Whip Antenna		**B** Collapsible Antenna		**C** Tilted Whip Antenna		Flexible Wire Antenna		
FREQ. RANGE	ANT. WITH LOADING COIL	ANT. LESS LOADING COIL	ANT. WITH LOADING COIL	ANT. LESS LOADING COIL	ANT. WITH LOADING COIL	ANT. LESS LOADING COIL	ANT. WITH LOADING COIL	ANT. LESS LOADING COIL	LOADING COIL ONLY
25- 30 MHz	NAB-1011A	NAD-6092A	NAB-1001A	85-84874H01	NAB-1021A	NAD-6160A	NAB-1031B	NAD-6170B	NJB-6011A
30- 42 MHz	NAB-1012A	NAD-6092A	NAB-1002A		NAB-1022A	NAD-6160A	NAB-1032B	NAD-6170B	NJB-6012A
42- 54 MHz	NAB-1013A	NAD-6092A	NAB-1003A		NAB-1023A	NAD-6160A	NAB-1033B	NAD-6170B	NJB-6013A
132-174 MHz	—	NAD-6092A	—		—	NAD-6160A	—	NAD-6170B	—
450-470 MHz	—	NAE-6010A	—	NAE-6000A	—	NAE-6040A	—	NAE-6050B	

Extra Long Antennas for Extended Range

	B Collapsible Antenna	
FREQ. RANGE	ANT. WITH LOADING COIL	ANT. LESS LOADING COIL
25-30 MHz	—	Order NAB-6160A For All Frequencies
30-36 MHz	NAB-1052A	
36-42 MHz	NAB-1053A	
42-48 MHz	NAB-1054A	
48-54 MHz	NAB-1055A	

Heliflex Antennas

D A complete line of Heliflex antennas are especially practical where obstacles are present.

85-82283J01	Heliflex antenna for H23DEN models (150.8-162 MHz) (Replaces NAD-6219A)
85-82283J02	Heliflex antenna for H23DEN models (162-174 MHz) (Replaces NAD-6220A)
85-82283J05	136-142 MHz (Replaces NAD-6221A)
85-82283J06	142-150.8 MHz (Replaces NAD-6222A)
NAE-6100B	406-420 MHz
NAE-6142B	450-470 MHz
NAE-6163A	470-512 MHz

Adapter Cable

E Supplied with a female receptacle and a miniature plug. Used to connect the H21, H23 DCN model to a mobile antenna or signal generator.

NKN-6065A Cable

Battery Chargers and Accessories

Single Unit Charger

F Nickel-cadmium battery can be charged by inserting it in charger separately, or leaving it in the radio and merely inserting radio into slot. The HT Series radio can continue to monitor while it is in the Charger. The Single Unit Charger is ideal for small systems or non-centralized charging facilities.

NLN-6259B Charger

Multiple Unit Charger

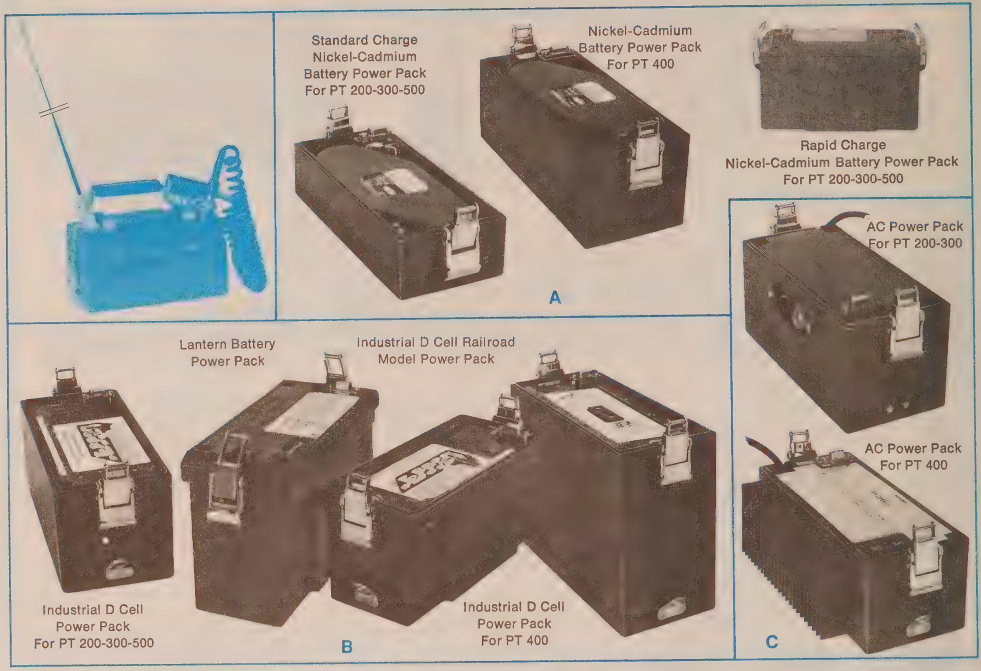
G This Charger can accommodate up tc 12 separate nickel-cadmium batteries or 12 HT Series radios at one time. Used in large systems and in multiple shift operations that require spare batteries.

NLN-6260B Charger

Batteries

60-84735H01	Nickel Cadmium Battery Kit contains 1 (14.4 volt) nickel cadmium rechargeable battery. (Replaces NLN-6238A).
60-82668D01	Mercury Battery Kit contains 1 (16 volt) mercury battery #303314. Not rechargeable. (Replaces NLN-6239A).
60-83624C01	Alkaline Battery Pack contains 1 (18 volt) alkaline battery. Not rechargeable.
60-83075E01	Mercury battery kit contains 1 (10.4 volt) battery used on hazardous duty models. (Replaces NLN-6547A).
60-83893E01	Nickel cadmium battery kit contains 1 (10 volt) battery used on hazardous duty models. **NOTE:** Radio not "intrinsically" safe with this battery. (Replaces NLN-6607A).

PT Series Accessories


Standard Charge
Nickel-Cadmium
Battery Power Pack
For PT 200-300-500
Nickel-Cadmium
Battery Power Pack
For PT 400
Rapid Charge
Nickel-Cadmium Battery Power Pack
For PT 200-300-500
A
AC Power Pack
For PT 200-300
Lantern Battery
Power Pack
Industrial D Cell Railroad
Model Power Pack
AC Power Pack
For PT 400
Industrial D Cell
Power Pack
For PT 200-300-500
B
Industrial D Cell
Power Pack
For PT 400
C

Power Packs

Interchangeable power packs quickly snap on to form lower portion of complete radio. Choice of power packs permits system design to meet your exact needs. All power packs provide full rated performance.

Nickel-Cadmium Battery Power Packs

A Nickel-cadmium power pack recommended when use time is predictable, for multi-shift operations and for vehicular applications. Provides 8 or 16 hours' operation per charge, depending on model.

NPN-6175A	Power pack, standard charge, less battery, PT 200, 300 & 500.
60-5128G01	Standard charge nickel-cadmium battery, PT 200, 300 & 500. (Replaces NLN-5205).
NPN-6176A	Power pack, less rapid charge battery, PT 200, 300 & 500.
60-5643G01	Rapid charge nickel-cadmium battery, PT 200, 300 & 500. (Replaces NLN-5372A).
NPN-1006A	Power pack & nickel-cadmium battery, PT 400.
NPN-6038A	Power pack, less battery, PT 400.
60-83420D01	Nickel-cadmium battery, PT 400 (Replaces NLN-6408A).

Industrial D Cell (Alkaline & Carbon-Zinc) and Lantern Battery Power Packs

B Industrial D cell (Alkaline and carbon-zinc) power pack is ideal for extended use away from centralized facilities. Fresh batteries are easily obtainable. Railroad model power pack fits mounting rack NLN-6268.

Lantern battery power pack designed to accommodate railroad's standard use of lantern batteries. Available with PT 200, PT 300 and PT 500 series only. Fits mounting rack NLN-6268.

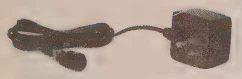
NPN-1008A	D cell power pack & 11 industrial D cells, PT 200, 300 & 500.
NPN-6030B	D cell power pack, less batteries, PT 200, 300 & 500.
60-5692G01	11 Alkaline industrial D cells, PT 200, 300 & 500. (Replaces NLN-5204).
NLN-6310A	11 carbon-zinc industrial D cells, PT 200, 300 & 500.
NPN-6042A	Lantern battery power pack, less batteries, PT 200, 300 & 500.
NPN-6033A	D cell railroad model power pack, less batteries, PT 200, 300 & 500.
NPN-6036A	D cell power pack, less batteries, PT 400.
NLN-6406A	22 carbon-zinc industrial D cells, PT 400.

AC Power Pack

C AC power pack provides unlimited power when radio's stationary for long periods. Ideal for base station use. Useful for emergency or auxiliary fixed operations of all kinds.

NPN-6032A	(117V ac), PT 200, 300 & 500.
NPN-6039A	(117/220V ac), PT 400.

PT Series Accessories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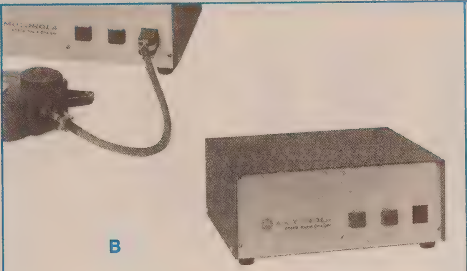
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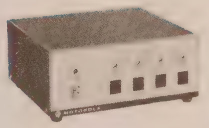
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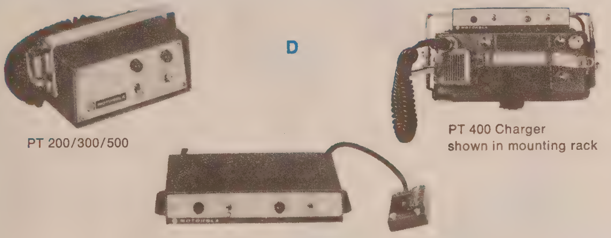
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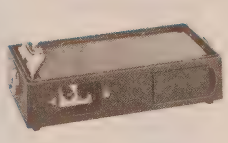
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Battery Chargers

Wall Socket Transformer Type Single Unit Standard-Rate Charger

A A single unit wall socket type charger provides a low-cost, lightweight unit for users who must take their charging capability with them wherever communications are needed. Any convenient 117V AC outlet will ensure a fully charged battery for your PT200, 300 or 500 Series radio.

NLN-5206A	Single unit standard-rate charger, wall socket type.

Single Unit Rapid Charger

B The single unit one-hour rapid charger provides two indicator lights; a red one to indicate the battery is rapid charging, and a green light to indicate that the battery is fully charged. The charger reverts to a standard charge to maintain the fully charged status. For PT-200/300 and 500 radios. Operates from 117V AC only. Order the appropriate charging cable kit separately.

NLN-5405A	Single unit rapid charger.
NKN-6267A	Rapid charge cable, battery inside power pack.
NKN-6268A	Rapid charge cable, battery outside power pack.

Multiple Unit AC Charger

C Recharges up to four batteries simultaneously, in or out of radio. Radio operates during charge when power pack remains attached. Three-position charge rate selector for high, normal or trickle charge. (Unit factory-wired for normal charge only—high rate obtained by changing internal jumper wire.) Order desired charging cables separately.

NLN-6480B	Charger PT 200/300/400/500 (117 VAC)
NKN-6110A	Charging Cable, Battery inside radio, PT 200/300/500
NKN-6111A	Charging Cable, Battery outside radio, PT 200/300/500
NKN-6094A	Charging Cable, Battery inside radio, PT 400
NKN-6095A	Charging Cable, Battery outside radio, PT 400

Vehicular Chargers

D Mounts under dash adjacent to radio mounting rack. Coil cord connects to radio's power pack. PT 400 vehicular charger mounts directly on radio mounting rack. Inserting radio automatically connects charger. Both models permit radio operation during charge. Order required wiring cables separately. For extended range, a mobile antenna can be used in lieu of normal antenna.

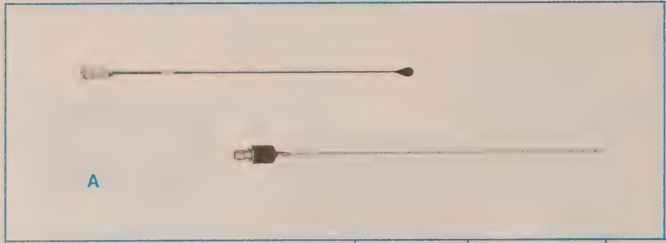
NLN-6270A	Charger PT 200/300/500 (6/12 VDC)
NKN-6074A	Wiring Cable 6V; ignition
NKN-6075A	Wiring Cable 12V; ignition
NKN-6076A	Wiring Cable 12V; cigar lighter adapter
NLN-6418A	Charger PT 400 (6/12 VDC)
NKN-6108A	Wiring Cable 6V; ignition
NKN-6109A	Wiring Cable 12V; ignition

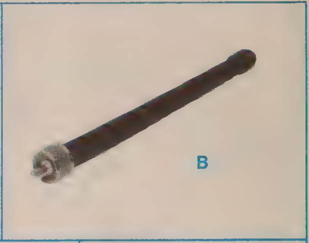
Integral AC/DC Charger

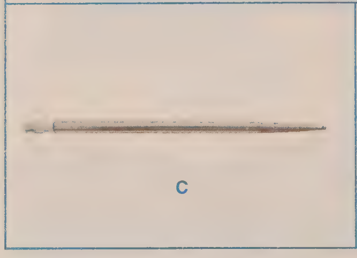
E Provides greatest operational flexibility. Use for portable, mobile or base station operation. Charger sandwiches between radio compartment and power pack. Switchable trinkle or full charge rate. Simply plug in appropriate cable for operation from 6/12/24 VDC or 117/220 VAC power source. Order wiring cables separately.

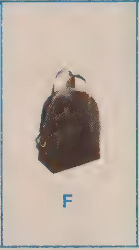
NLN-6474A	Charger PT 200/300/500 6/12/24 VDC; 117/220 VAC
NKN-6104A	Wiring Cable 6/12 VDC; ignition PT 200/300/500
NKN-6117A	Wiring Cable 6/12/24 VDC; ignition, PT 200/300/500
NKN-6105A	Wiring Cable 117/220 VAC, PT 200/300/500
NLN-6531A	Charger PT 400 6/12 VDC; 117/220 VAC
NKN-6108A	Wiring Cable 6 VDC; ignition, PT 400
NKN-6109A	Wiring Cable 12 VDC; ignition, PT 400
NKN-6112A	Wiring Cable 117/220 VAC, PT 400

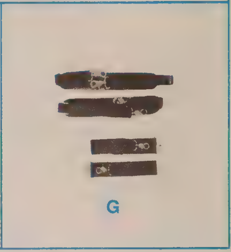
PT Series Accessories











Antennas

Whip

A Flexible whip antenna provides protection when radio's used near obstacles. Snaps back to canted position. Provides good reception and transmission.

PT 200/300

NAB-6141A	(25-30 MHz)
NAB-6142A	(30-36 MHz)
NAB-6143A	(36-42 MHz)
NAB-6144A	(42-48 MHz)
NAB-6145A	(48-54 MHz)

PT 200/300/400/500

NAD-6181B	(132-150.8 MHz) (replaces NAD-6120A)
NAD-6182B	(150.8-162 MHz) (replaces NAD-6121A)
NAD-6183B	(162-174 MHz) (replaces NAD-6122A)

Heliflex Antennas

B Heliflex antennas are short and flexible. Especially practical where obstacles are present. Provides good reception and transmission.

85-5542G01	(136-142 MHz) (replaces NAD-6331)
85-5542G02	(142-150.8 MHz) (replaces NAD-6332)
85-5542G03	(150.8-162 MHz) (replaces NAD-6333)
85-5542G04	(162-174 MHz) (replaces NAD-6334)

Telescopic

C Telescopic antenna provides maximum protection from damage when radio's not in use. Collapses down out of way. Gives extended range.

NAB-6090A	(25-54 MHz) PT 200/300

Loading Coils and Rods

Antenna	Coil	Rod
NAB-6141A	**1-80732A34**	Order **47-483170** For All Frequencies
NAB-6142A	**1-80732A35**	
NAB-6143A	**1-80732A36**	
NAB-6144A	**1-80732A37**	
NAB-6145A	**1-80732A38**	

Vehicular Rain Gutter Antenna

D Vehicular rain gutter antenna clips firmly to vehicle's rain gutter. Provides extended range when operating from inside vehicle.

NDD-6000A	Vehicular rain gutter antenna, VHF, 132-174 MHz.

Carrying Accessories

Carrying Strap

E Tough black nylon carrying strap ideal for over-the-shoulder carry. Adjustable straps securely snaps to radio.

NLN-6129A	All models

Carrying Bag

F Full-zippered weather-resistant sturdy canvas carrying bag heavily padded to protect radio on trips. Covered pocket for spare battery storage.

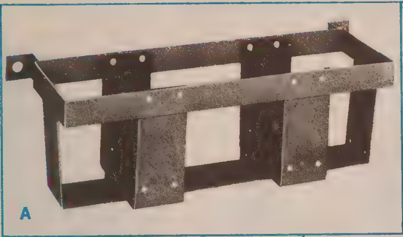
NLN-6262A	PT 200/PT 300/PT 500
56-83521D01	PT 400 (Replaces NLN-6419)

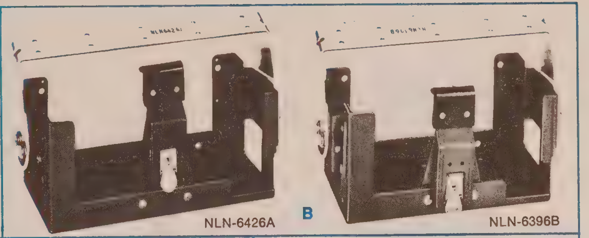
Back Pack Harness

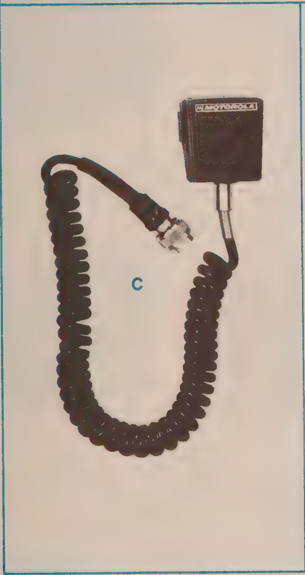
G Back pack harness holds radio firmly and comfortably on user's back, leaving hands free. Adjustable for snug fit.

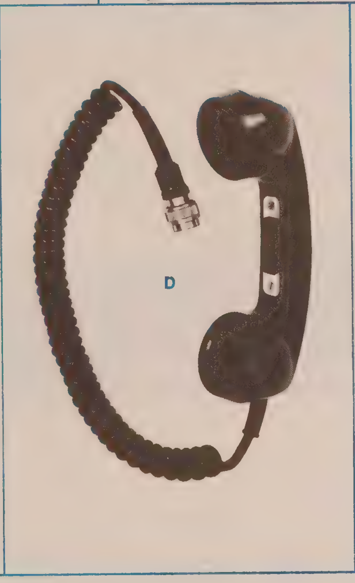
NLN-6312A	For use with "D" cell power packs only

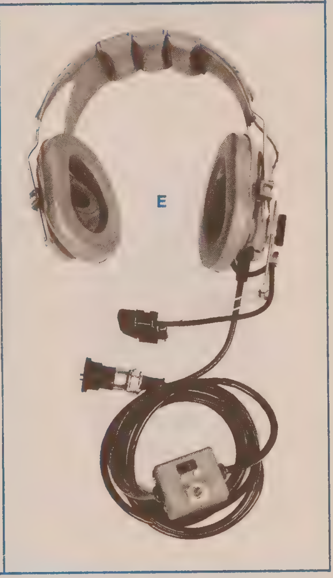
PT Series Accessories











Mounting Racks

Universal Wall Rack

A Universal wall rack accepts "D" cell and AC power packs for PT-200/300/500. Ideal for permanent location on walls, railroad cars, heavy equipment, etc.

NLN-6268A	PT-200/300/500 except nickel-cadmium and lantern battery power packs.

Vehicular Racks

B Vehicular rack grips radio to prevent falling or bouncing in moving vehicle or train. Detachable trunnion permits mounting flexibility. On PT 400 Series, vehicular charger can be mounted under trunnion.

NLN-6426A	PT-400; except AC power pack NPN-6039.
NLN-6396B	PT-200/PT-300/PT-500, all power packs except NPN-6042 lantern and NPN-6033 railroad "D" cell.

Other Accesories

Microphone

C Popular dynamic microphone on coil cord with push-to-talk switch is light and small. Attaches securely to top of housing when not in use. Recommended for mobile use.

NMN-6018A	For PT-200/300/400 models.
NMN-6093A	For PT-500 models.

Handset

D Handset operates like telephone handset; except has "push-to-talk, release-to-listen" control bar. Ideal for high noise level areas. Radio speaker permits monitoring without keeping handset to ear.

50-82433G01	All models (Replaces NMN-6017)

Aircraft-Type Headset/Lip Microphone

E Aircraft-type headset and lip microphone kit ideal in high ambient noise level areas. Includes push-to-talk unit and all necessary cables.

NMN-6009B	All models.

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PAGECOM Series Accessories

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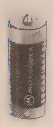

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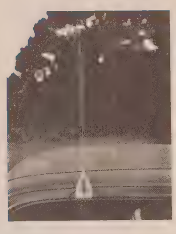

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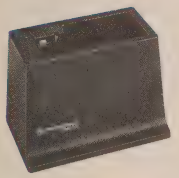

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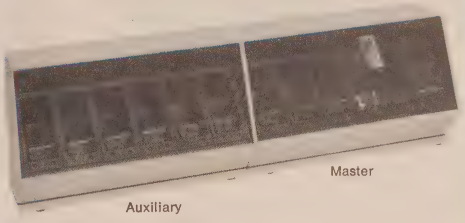

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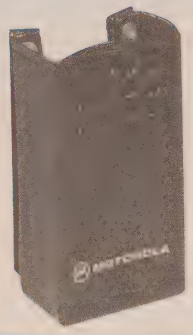

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Batteries

Mercury

A Mercury batteries allow long use time without replacement. Ideal for extended use applications or unpredictable operating hours. Mercury batteries typically provide 180 hours' continuous operation.

60-82168J01	(Replaces NLN-6199)
NEN-6034A	pack of 20 mercury batteries

Nickel-Cadmium

B Rechargeable nickel-cadmium batteries are ideal for multi-shift operations or when receiver's use time is predictable, permitting batteries to be recharged on a regular basis. Nicad batteries typically provide 40 hours' operation per 12-hour charge or 8 hours' operation per 2½-hour charge.

60-5104A01	(Replaces NLN-6965)

Lapel Speaker

C Lapel speaker is ideal for high noise level areas. Speaker cord plugs into external speaker jack on radio. Speaker clips to upper garment and provides strong reception near user's ear.

NSN-6015A	Tone & Voice model only

Vehicular Rain Gutter Antenna

D Vehicular rain-gutter antenna clips firmly to vehicle's rain gutter. Antenna adapter cable connects vehicular antenna cable to external jack on radio. (Order antenna adapter cable separately.) Provides extended range in vehicle.

NDD-6000A	VHF, 132-174 MHz Antenna
NKN-6065A	Antenna Adapter Cable

Battery Chargers

Single Unit

E Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges batteries in radio and two spare batteries simultaneously.

NLN-8252A	117 VAC
NLN-8411A	230 VAC

Multiple Unit

F Multiple unit master charger designed for large system users or multi-shift operations requiring spare batteries. Accommodates up to five pagers and 10 spare batteries. Auxiliary charger plugs into master charger and accommodates up to six additional pagers and 12 spare batteries. Three auxiliary chargers can be operated from each master charger for a total of 23 pager and 46 spare battery accommodations. Other features same as single unit.

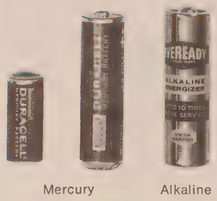
NLN-8412A	117/230 VAC Multiple Unit Master
NLN-8413A	117/230 VAC Multiple Unit Auxiliary (shown with master)

Carrying Case

G Leather carrying case allows pager to be worn on belt. Fits belts up to 2½ inches wide.

15-5859B01	Leather Carrying Case

PAGEBOY II Series Accessories



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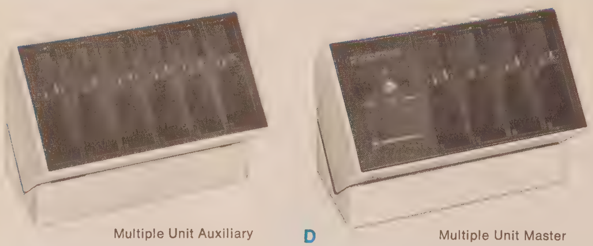

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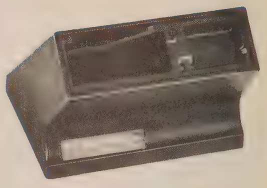

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Batteries

Mercury and Alkaline

A Mercury and alkaline batteries allow long use times without replacement. Ideal for extended periods away from centralized facilities. Mercury battery typically provides 200 hours' continuous operation (tone and tone & voice models) or 560 hours' continuous operation (tone-only model). Alkaline battery typically provides 370 hours continuous operation (tone-only model). With battery saver option, tone-only model batteries last 2½ times longer than stated above. (Motorola-approved or equivalent batteries must be used to attain these high use times.)

60-82168J01	Mercury. Tone and tone & voice model (Replaces NLN-6199)
60-84306A65	Mercury. Tone-only model (Replaces NLN-8277)
NEN-6034A	Quantity of 20 60-82168J01
60-5310A01	Alkaline. Tone-only model (Replaces NLN-8278A)

Nickel-Cadmium

B Rechargeable nickel-cadmium batteries are ideal when receiver's use time is predictable, permitting battery to be recharged on a regular basis. Nicad battery typically provides 40 hours' continuous operation per 12-hour charge (tone and tone & voice model) or 37 hours' continuous operation per 12-hour charge (tone-only model). With battery saver option, tone-only model battery provides 92 hours per charge. (Motorola-approved or equivalent batteries must be used to attain these high use times.)

60-5104A01	Nickel-Cadmium. Tone and tone & voice models (Replaces NLN-6965A)
NLN-8276A	Nickel-Cadmium. Tone-only model kit consists of 60-5104A01 battery & 1-5953A16 adapter.

Battery Chargers

Single Unit

C Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges battery in radio and spare battery simultaneously.

NLN-1147A	117V ac (Replaces NLN-1094A)
NLN-8584A	230V ac (Replaces NLN-8238A)

Multiple Unit Master and Auxiliary

D Multiple unit master charger designed for large system users or multi-shift operations requiring spare batteries. Accommodates up to four radios and batteries. Auxiliary charger plugs into master charger and accommodates up to six additional radios and batteries. Three auxiliary chargers can be operated from each master charger for a total of 22 accommodations. Other features same as single unit.

NLN-8585A	Multiple Unit Master. 117/230V ac (Replaces NLN-8086A)
NLN-8586A	Multiple Unit Auxiliary. 117/230V ac (Replaces NLN-8087A)

Vehicular

E Vehicular charger mounts under dash. Key lock protects radio from theft. Power cable included. For greater range with tone and voice models, an antenna coupler is provided for connection to any VHF High Band mobile antenna.

NLN-8587A	12V dc (Replaces NLN-6967A)

Standard Housing Kit

Extra-Loud Housing Kit

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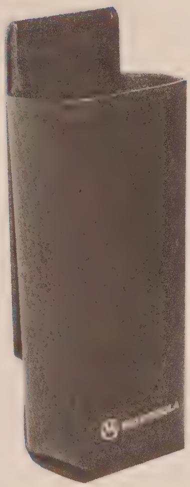

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Housing Kits

A Housing kits permit field conversion from Standard model to Extra-Loud Housing model and vice versa (tone and tone and voice models only). Colored housings are also available for FNC Pagers which can replace the standard shadow-blue housing normally supplied with the pager.

NHN-6193A	Standard Housing Kit. Tone and tone & voice models
NHN-6205A	Standard Housing Kit. Tone-only models
NHN-6194A	Extra-Loud Housing Kit. Tone and tone & voice models
NHN-6222A	Standard Shadow-Blue, FNC Pagers only
NHN-6224A	White, FNC Pagers only
NHN-6225A	Red, FNC Pagers only

Acoustical Coupler

B Acoustical coupler kit ideal for high level ambient noise areas. Earpiece fits onto ear and connects to coupler plugged into Extra-Loud Housing.

NLN-6969A	Acoustical Coupler Kit. Extra-Loud Housing model only

Lanyard

C This accessory is a practical device that helps to minimize dropping your pager. One end attaches to your pager; the other can be clipped to your belt or a pocket.

NLN-8550A

Carrying Case

D The carrying case is a safe and convenient means of carrying your pager. The leather carrying case protects your pager and allows the unit to be worn on the belt.

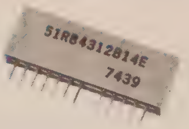
15-5269B01	Standard housing
15-5270B01	For extra-loud housing

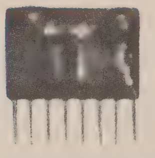
Lapel Speaker

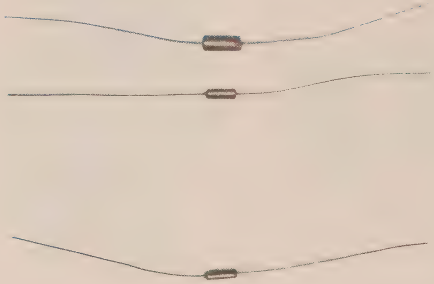
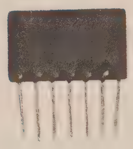
Designed for FNC Pagers only, this accessory is ideal in areas of high background noise or where a degree of privacy is desired when receiving a voice message. The lapel speaker is simply plugged into the speaker (SPKR) jack on top of the Pager.

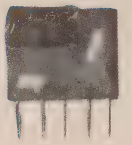
NSN-6021A	Lapel Speaker for FNC Pagers

PAGEBOY II Series Accessories







Code Plugs

A Code setting has been simplified by the exclusive Motorola code plug. Codes for each individual pager are selected by manually inserting an inexpensive code plug into the radio.

51-84312B14	Unprogrammed Code Plug for A01MEC and A03MEC Pagers
NLN-8636A	Unprogrammed Code Plug for A03TEC Pager
NLN-8515A	Programmed Code Plug for A01MEC and A03MEC Pagers
NLN-8630A	Programmed Code Plug for A03TEC Pager (Single Function)
NLN-8635A	Programmed Code Plug for A03TEC Pager (Dual Function)

Field Add On Kits

MEM-O-LERT Option

B This option provides the facility for monitoring the channel and noting paging calls while the pager alert circuits are disabled. This feature is used when the user does not wish to be disturbed or to cause a disturbance when the pager is alerted. With the "on-off" switch at the top of the MEM-O-LERT pager placed in the center position (black dot), the pager is on, but will not emit an alert tone. When the need for silence has passed, the "on-off" switch is depressed or set to the "on" position. The alert tone sounds at this time if a call has been received during the silent period.

NLN-1095A	DNC Tone & Voice
NLN-6960A	DNC Tone-Only
NLN-8578A	A01CAC Sub-audible coding
NLN-8497A	A03CAC Sub-audible coding
51-84312B09	A01CAC and A03CAC Normal coding

Battery Saver

C An electronic switch powers the receiver twice a second. During these short sampling periods the receiver looks for a carrier. When the pager recognizes that transmitters are on the air, it locks onto the rf signal. At the end of the signal, the pager reverts back to its sampling mode of operation. This feature more than doubles the life of the battery in a typical system. (Not available for Sub-Audible Models).

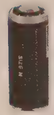
NLN-8576A	A01CAC
NLN-8273A	A03CAC

Group Call

D Selected groups of pagers equipped with the group call option may be alerted simultaneously with a group call number. These pagers may also be alerted individually with the normal pager number. The alert tone produced by a group call is a continuous tone instead of the interrupted tone produced by a standard pager. The group call option is available in all of the models listed in the model table.

51-84312B08	DNC Tone Only and Tone & Voice

MINITOR and DIRECTOR Pagers



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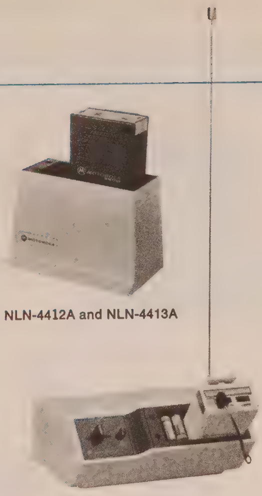

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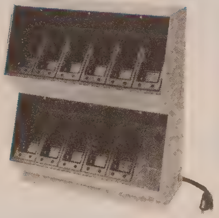
NLN-4412A and NLN-4413A

NLN-5264A and NLN-5265A
or
NLN-5219A and NLN-5220A



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Batteries

The "Minitor" Alert Monitor and "Director" Pagers each contain two batteries. Replace both batteries as a set to ensure best performance. The batteries are accessible from the bottom of the unit.

Mercury

A Mercury batteries allow long use times without replacement. Ideal for extended periods away from centralized facilities. Mercury battery typically provides 180 hours continuous operation for VHF paging and 140 hours for UHF paging. (Motorola approved or equivalent batteries must be used to attain these high use times).

60-82936C01	Pack of 2 mercury batteries
NEN-6034A	Box of 24 mercury batteries (Similar to NLN-6199 & 60-5633A01)

Nickel-Cadmium

B Rechargeable nickel-cadmium batteries are ideal when receiver use permits recharging on a regular basis. Nicad batteries typically provide 40 hours continuous operation per 12-hour charge for VHF pagers, and 30 hours for UHF pagers.

60-5104A01	Nickel-cadmium battery (order 2) (replaces NLN-6965A)

Battery Chargers

Single Unit

C Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges battery in radio and spare battery simultaneously. Several types of single unit chargers are availabe. There is an attractively styled charger only, a charger with housing mounted antenna and ground plane, and a charger/amplifier/antenna combination with an integral audio amplifier that provides 2.5 Watts of audio output at full volume for those applications that require extra loud audio. Amplifier cord is plugged into speaker jack on pager and volume is adjusted with control on pager.

In chargers with external antenna, connection to the antenna occurs automatically when the pager is inserted into the charger. In most instances, this improves sensitivity up to 20 dB in fringe areas.

These chargers are safe and easy to use and feature a grounded line cord and three-prong plug for full compliance with OSHA regulations. These single unit chargers are capable of charging a pager and set of spare batteries, simultaneously. It is impossible to damage a battery by overcharging. Two indicator lights are provided on the charger to indicate positive charging contact. Order antennas separately as indicated below.

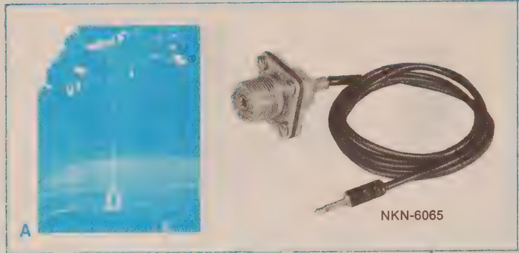
NLN-4412A	Charger, 117V AC
NLN-4413A	Charger, 220V AC
NLN-5264A	Charger, 117V AC with ant. jack and ground plane (replaces NLN-1335, NLN-4142 and NLN-1500). Order ant. separately below.
NLN-5265A	Charger, 220V AC with ant. jack and ground plane (replaces NLN-1336, NLN-4143 and NLN-1501). Order ant. separately below.
NLN-5219A	Charger, 117V AC with ant. jack, ground plane and audio amp. (replaces NLN-1292, NLN-1492, and NLN-4252). Order ant. separately below.
NLN-5220A	Charger, 220V AC with ant. jack, ground plane and audio amp. (replaces NLN-1293, NLN-1493, and NLN-4253). Order ant. separately below.
85-83600G01	Antenna for above chargers. 30-50 MHz (replaces NAB-6191).
01-83965E02	Antenna for above chargers. 132-174 MHz (replaces NAD-6310).
NAE-6105A	Antenna for above chargers. 406-512 MHz (replaces NAE-6290).

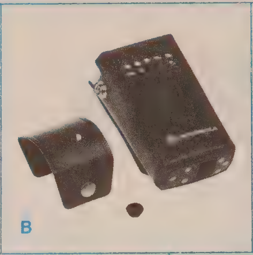
Multiple Unit Master and Auxiliary

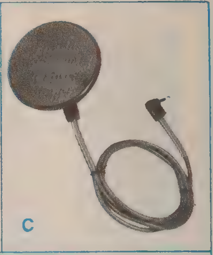
D Multiple unit charger designed for large system users or multi-shaft operations requiring spare batteries. The master charging unit will simultaneously charge 5 pagers plus 10 spare batteries and can accommodate up to 3 auxiliary chargers. Auxiliary charger plugs into master charger and can charge as many as 6 pagers and 12 spare batteries; maximum charging capacity of one master unit and three auxiliary units is 23 pagers and 46 batteries. Master unit operates on 117V or 234V ac., 50-60 Hz.

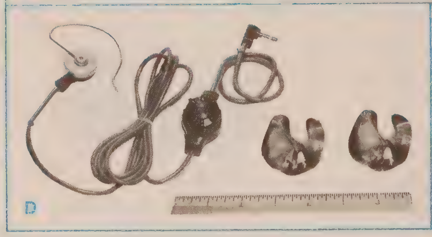
NLN-8412A	Multiple unit master charger.
NLN-8413A	Multiple unit auxiliary charger.

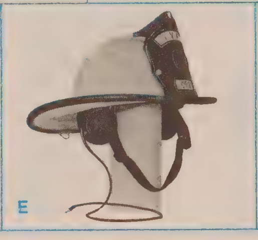
MINITOR and DIRECTOR Pagers

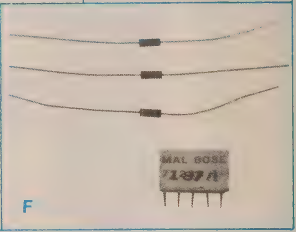












Antenna

A Vehicular rain-gutter antenna clips firmly to vehicle's rain gutter. Antenna adapter cable connects vehicular antenna cable to external jack on radio. (Order antenna adapter cable separately). Radio normally carried above sun visor in vehicle. Provides extended range in vehicle.

NDD-6000A	Vehicular Rain Gutter. VHF, 132-174 MHz.
NKN-6065A	Antenna Adapter Cable.

Carrying Case

B This durable leather carrying case protects the pager from damage in applications demanding rough usage.

NLN-4589A	Carrying Case

Lapel Speaker

C Lapel speaker is ideal in high noise level areas when private listening is not required. Speaker plugs into external speaker jack on radio and clips to upper garment and provides strong reception near user's ear.

NSN-6015A	Lapel Speaker

Earpiece Speakers

D Wired earpiece speaker with volume control plugs into external speaker jack on radio and provides private listening. For better reception in high noise level areas, an ear mold formed to contour of ear encloses earpiece speaker and inserts into ear to baffle outside noise.

50-82202A03	Earpiece Speaker/Volume Control (replaces NSN-6007A).
50-83851B01	Ear Mold Kits. Right ear (replaces NLN-6391).
50-83851B02	Ear Mold Kits. Left ear (replaces NLN-6392).

Helmet Liner/Speaker Assembly for Minitor Pager

E Designed specifically for fire ground communications where the high ambient noise levels at the fire scene make normal communication difficult, this accessory consists of a fire helmet liner with special ear "flaps" each containing a small water resistant speaker. The "flaps" do not touch the ears and consequently don't impair normal hearing. They do, however, bring the voice message so close to the ear that it can be heard over almost any noise environment.

This wired-for-sound helmet liner assembly connects to the monitor via a cord plugged into the monitor's speaker jack. The assembly is retro-fittable to most existing fire helmets and provides an improved level of officer-to-fire-fighter communications—and safety.

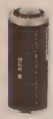
TDN-6261A	Helmet liner headset for Cairns #880.
TDN-6262A	Helmet liner headset for Mine Safety Appliance #91605.
TDN-6263A	Helmet liner headset for Firecraft #52-501.

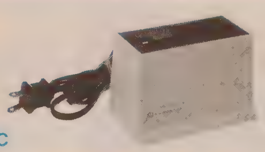
Group Call Kit for Field Installation

F Selected groups of pagers equipped with the group call option may be alerted simultaneously with a group call number. These pagers may also be alerted individually with the normal pager number. The alert tone produced by a group call is a continuous tone instead of the interrupted tone produced by a standard pager. The group call option is available in all of the models listed in the model table.

NLN-4258A	Group call decoder for selective call models.

SPIRIT and DIMENSION IV Pagers





Mercury Battery

A The pager can be operated with an inexpensive, throwaway, N-cell size mercury battery. The Motorola type 60-82936C01 Battery is recommended for optimum performance of the pager since this battery has been tested for life and leakage characteristics. N-cell size batteries from other manufacturers not tested by Motorola are not recommended. The life expectancy for the 60-82936C01 Battery in normal operation is 180 hours.

Note: Mercury batteries are not rechargeable. However, if a pager with a mercury battery is placed in a charger, no damage will result. An interlock, built into the pager, prevents the application of charging voltage when a mercury battery is in use. If a nickel-cadmium battery is used, the interlock permits normal charging.

60-82936C01	Pack of 2 mercury batteries
NEN-6034A	Box of 24 mercury batteries (Similar to NLN-6199)

Nickel-Cadmium Battery

B The pager is also designed to operate with a rechargeable nickel-cadmium battery (Motorola type 60-5104A01). This battery provides 40 hours of normal operation per 12-hour charge. The pager may be left on while it is in the charger, or it can be charged for less than the 12-hour period. The following table provides a useful guide to the number of operating hours that may be expected from other charging times.

RECHARGE TIME (HOURS)	HOURS OF OPERATION	
	PAGER "OFF" IN CHARGER	PAGER "ON" IN CHARGER
12	40	32
6	20	16
3	10	8
2.5	8	6

60-5104A01	Battery Nickel-Cadmium (replaces NLN-6965A)

Single Unit Charger

C The single unit battery charger is ideal for small system users or non-centralized charging facilities. It charges the nickel-cadmium battery either in the pager or separate from the pager. Two light-emitting diodes (LEDs) are provided to indicate charging in the pager compartment and in the spare battery compartment. The single unit battery charger can charge the battery in the pager and a spare battery simultaneously.

NLN-4508B	Charger, Single Unit 117V
NLN-4509B	Charger, Single Unit 230V

Multiple Unit Battery Chargers

D The master multiple unit battery charger is primarily for use in large systems or multi-shift operations requiring spare batteries. It accommodates up to five pagers and five spare batteries. The auxiliary multiple unit battery charger is connected to the master charger and accomodates up to six additional pagers and batteries. Three auxiliary chargers can be operated from a master charger for a total charging capability of 23 pagers and 23 spare batteries. The charging features and LED indicators operate identically to the single unit charger description. These units are suitable for desk and table top use or wall mounting.

NLN-4510B	Multi Unit Charger
NLN-4511B	Multi Unit Slave

Disassembly Tool

E Disassembly tool recommended for changing battery and removing top cover.

RSX-4003A	Disassembly tool

Field Add-On Group Call Kit

Group Call

F Selected groups of pagers equipped with the group call option may be alerted simultaneously with a group call number. These pagers may also be alerted individually with the normal pager number. The alert tone produced by a group call is a continuous tone instead of the interrupted tone produced by a standard pager.

51-84312B08	Group Call Kit (replaces NLN-4513A)

METRX Pager

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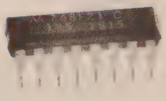

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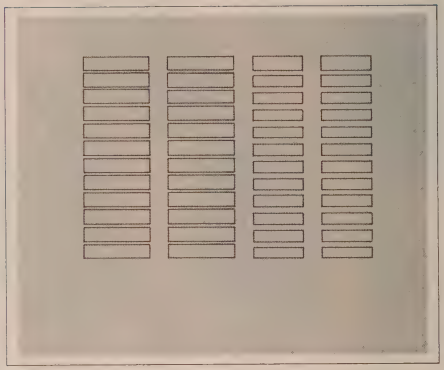


C

Alkaline Battery

A "Metrx" pager is designed to operate with an inexpensive throwaway "AA" size battery.

The life of a disposable battery depends on several variables; the type of battery, the number of subscribers in the paging system and the number of pages received. Alkaline batteries, on the average, provide approximately 17 to 19 weeks of service (6 to 8 weeks for pagers not equipped with battery saver).

60-5310A01	Alkaline Battery (replaces NLN-8278A)

Code Plugs

B Unprogrammed code plugs are available as well as the programmed code plugs normally supplied with the pagers. Unprogrammed units can be programmed in the field using the Motorola SP-4901761 code plug Programmer/Reader (available from your Motorola representative) and "Metrx" Pager adapter SP-4902641.

NLN-4150A	Code plug unprogrammed
NLN-4327A	Code plug programmed (specify code for programming)

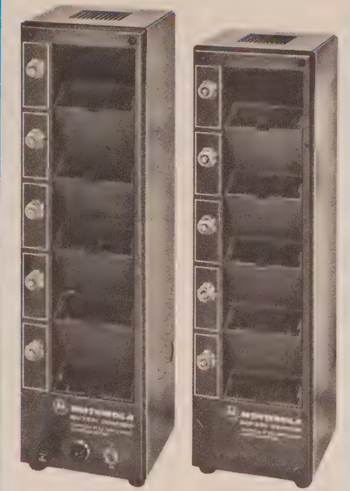
Code Plug Label

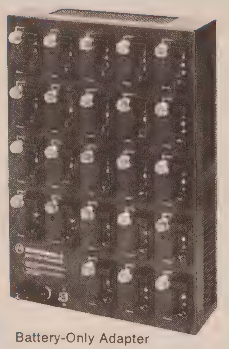
C Blank labels for code plugs come in 6" x 5" sheets. Codes can be typed in. Approximately 48 labels per sheet.

54-5928D01	6" x 5" Code Sheet

PAGEBOY Tone and Voice Accessories

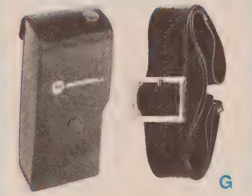
C
Single Unit
MOTOROLA
TWIN PAGEBOY UNIT


Multiple Unit Master and Wall Mounting Kit
Multiple Unit Auxiliary
D


E Battery-Only Adapter

A
DURACELL
MALLORY

F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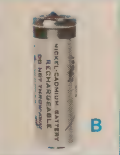

B

Batteries

Mercury

A Mercury battery allows long use time without replacement. Ideal for extended periods away from centralized facilities. Typically provides 90 hours' continuous operation.

60-868967	(Replaces NLN-6430)

Nickel-Cadmium

B Rechargeable nickel-cadmium battery ideal when receiver's used in shift applications or in predictable operating hours that permit battery to be charged on regulated basis. Typically provides 12 hours' operation per 12-hour charge.

60-83009H02	(Replaces NLN-6431)
60-83778H03	UL listed (Replaces NLN-6811)

Battery Chargers

Single Unit and Battery-only Adapter

C Single unit charger ideal for small system users or non-centralized charging facilities. Designed for desk-top use. Charges battery in radio only. (Battery-only adapter available to charge spare battery—adapter slips into charger.)

NLN-6432B	Single Unit. 117 VAC.
NLN-8102A	Single Unit. 234 VAC.
NLN-6433B	Battery-Only Adapter. 117 VAC.

Multiple Unit Master and Auxiliary

D Multiple unit master charger designed for large system users or multi-shift operations requiring spare batteries. Designed for desk-top use. (Wall mounting kit available to mount master and four auxiliary chargers on 16-inch centers.) Up to four auxiliary chargers can be plugged into master charger. Each unit accommodates up to five radios. Switchable "trickle" or "normal" charge rate. Charges battery in radio only. (Battery-only adapter available to charge spare batteries—adapters slip into charger slots.)

NLN-6455B	Multiple Unit Master. 117 VAC.
NLN-6459B	Multiple Unit Auxiliary. 117 VAC.
NLN-6492A	Wall Mounting Kit
NLN-6433B	Battery-Only Adapter. 117 VAC.

Battery-only Multiple Unit

E Battery-only multiple unit charger ideal for multi-shift operations requiring spare batteries. Accommodates up to 23 spare batteries. Switchable "trickle" or "normal" charge rate. Wall mounted.

NLN-6491B

Antenna

F Vehicular rain-gutter antenna clips firmly to vehicle's rain gutter. Antenna adapter cable connects vehicular antenna cable to external jack on radio. (Order antenna adapter cable separately.) Radio normally carried above sun visor in vehicle. Provides extended range in vehicle.

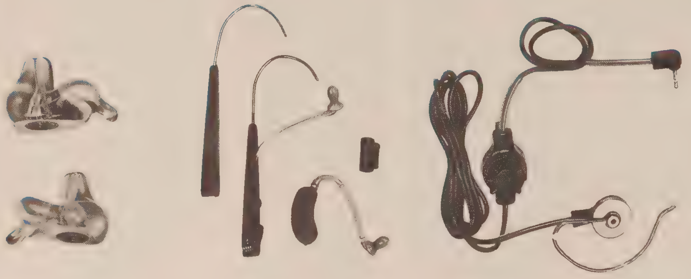
NDD-6000A	Vehicular Rain Gutter. VHF, 132-174 MHz
NKN-6065A	Antenna Adapter Cable

Carrying Accessories

G Sturdy black leather carrying case protects pager. Heavy-duty snaps on integral belt loop permit quick belt attachment and release. Adjustable matching black belt recommended for carrying case.

NLN-6454A	Carrying Case
42-865599	Belt. (Replaces NLN-6042A)

PAGEBOY Series Accessories



Wireless Earpiece Speaker/Inductor

Earpiece Speaker/Volume Control

A

B

Remote Operation Accessories

Earpiece Speakers

A Wired earpiece speaker with volume control plugs into external speaker jack on radio and provides private listening. For better reception in high noise level areas, an ear mold formed to contour of ear encloses earpiece speaker and inserts into ear to baffle outside noice. For maximum concealment and comfort, wireless speakers can be used in lieu of wired earpiece speaker. An inductor replaces the wired earpiece speaker and, through inductive transmission, excites the wireless earpiece.

50-82202A03	Earpiece Speaker/Volume Control. (Replaces NSN-6007A)
NLN-8318A	Wireless Earpiece Speaker/Inductor. Behind-the-ear style
NLN-8319A	Wireless Earpiece Speaker/Inductor. Eyeglass style
60-5423A01	Battery for NLN-8318A
60-5423A02	Battery for NLN-8319A
50-83851B01	Ear Mold Kits. Right ear (Replaces NLN-6391)
50-83851B02	Ear Mold Kits. Left ear (Replaces NLN-6392)

Lapel Speaker

B Lapel speaker is ideal in high noise level areas when private listening's not required. Speaker clips to upper garment and provides strong reception near user's ear.

NSN-6015A	Lapel Speaker

Accessories for H01ANC Series 30-50MHz VHF Tone and Voice Pager

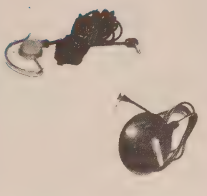
NLN-6010A	Mercury Battery Kit, contains one 2½ volt and two 4 volt batteries
60-861302	Nickel Cadmium Battery Repl. NLN-6012B
NLN-6104A	Single Unit Battery Charger
NSN-6005A	Lapel Speaker, with cord
50-83693B01	Earpiece, with Volume Control (requires NLN-6391 or 6392 Ear Mold) (Replaces NSN-6010A)
50-83851B01	Right Ear Mold (requires NSN-6010 Earpiece) (Replaces NLN-6391A)
50-8351B02	Left Ear Mold (requires NSN-6010 Earpiece) Replaces NLN-6392A
NKN-6011A	Adapter Cable Kit, for vehicular antenna
NAB-6000A	Antenna-Pant Leg, 25-54 MHz Specify Frequency), for use with HO1ANC Series
NLN-6011A	Battery Charger, master with provisions for three auxiliary battery chargers. Charges up to 5 Radio Pagers
NLN-6060A	Battery Charger, auxiliary. Charges up to 5 Radio Pagers

Accessories for H01BNC (33-37 & 41-45MHz) and H03BNC (148-174MHz) PAGEBOY Tone Only and Tone and Vibrate Pagers

60-83009H01	Nickel-Cadmium Battery (Replaces NLN-6394A)
60-83778H02	Nickel-Cadmium UL Approved Battery (Replaces NLN-6810A)
60-868968	Mercury Battery (Replaces NLN-6399A)
NLN-1069A	Single Unit Battery Charger
NLN-6395A	Battery only Charging Adapter
NLN-6488B	Multiple Unit Battery Charger (5 charging receptacles) Master
NLN-6489B	Multiple Unit Battery Charger (5 charging receptacles) Auxiliary
NLN-6490B	Multiple Unit Battery ONLY Charger (23 charging receptacles)
NLN-6492A	Wall Mounting Kit mounts up to 5 multiple chargers (not battery only type) on 16″ wall stud spacing
NLN-6457A	Carrying Case-Black (less belt)
42-865599	Belt for Carrying Case-Black (Replaces NLN-6042A)
NLN-6790A	Service Tool Kit

VHF Pocket Receiver, Transmitter, LF and VHF Pager Accessories

A



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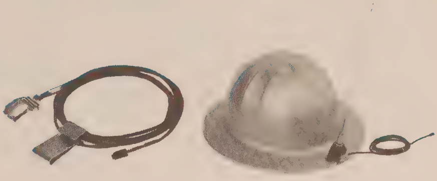

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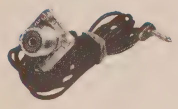


D

E

Microphones

A Boom microphones with floating arm assemblies, desk stand microphones, and dial telephone desk sets for paging operations.

NMN-6013B	Desk stand microphone w/6 Prong connector
NMN-1001B	Boom Microphone W/Floating Arm Assembly and Cable complete
45-82328B01	Floating Arm only
NMN-6014A	Dial Telephone Desk Type

Lapel Speakers and Earpieces

B Use lapel speakers or earpieces for better reception in high noise level areas.

NSN-6006A	Lapel Speaker with cord for L.F. Pager
NSN-6002A	Lapel Speaker with cord for early models L.F. Pager
50-82202A03	Earpiece with cord for L.F. Pager (replaces NSN-6007A)
NSN-6005A	Lapel Speaker—phone plug for "Speaker-Disconnect." 500 mw audio models for pocket receiver.
50-83693B01	Earpiece w/volume control — phone plug for pocket receiver. (replaces NSN-6010A)

Antennas

C Antennas for pocket receivers and transmitters.

NAB-6000A	Leg Antenna for pocket receiver 25-54 MHz w/ phone plug
NAD-6000A	Leg Antenna for pocket receiver 144-174 MHz w/phone plug
NAD-6050A	Helmet Antenna for pocket receiver 144-174 MHz w/phone plug. Helmet not supplied by Motorola.
85-84874H01	Telescopic Antenna for H11, 13NBC, 25-24 MHz & 132-174 MHz pocket transmitter (Replaces NAD-6082B)
NAD-6092A	Whip Antenna for H11, H13NBC, 25-54 MHz & 132-174 MHz pocket transmitter

Adapter Cable

D Adapter cable for vehicle antenna or bench test. Terminated in phone plug.

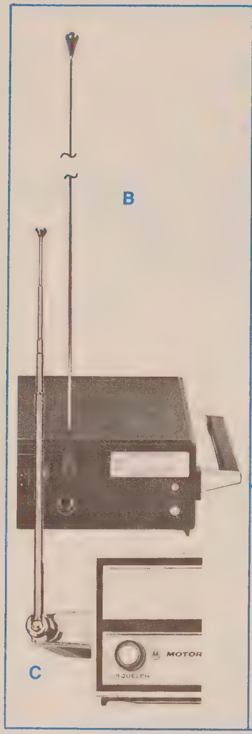
NKN-6011A	Adapter Cable

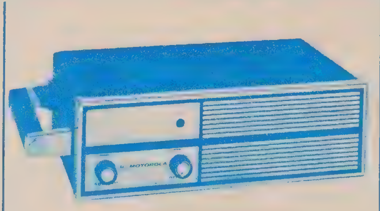
Battery Kits

E Battery kits and accessories for older receivers, transmitters, and pagers.

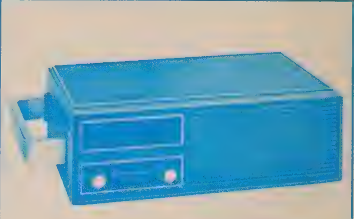
NLN-6010A	Kit for receiver. (2) 4-volt and (1) 2.5 volt mercury batteries.
60-861302	Rechargeable nickel-cadmium batteries for receiver consists of 1-2.5V and 2-3.75V batteries. PK-564 required to hold batteries for charging outside unit. (Replaces NLN-6012B)
NLN-6116A	For H11, 13NBC transmitter consists of (4) 4 volt mercury batteries.
PK-564	Battery holder and adapter
60-868967	4 volt battery for earlier versions of low frequency pager receiver
NK-149	Kit of 10 Ea. 4 volt battery.
60-82168J01	1.4 volt mercury battery (E401E Type) for current versions of low frequency pager consists of 1 battery. (replaces 60C82936C01)
NEN-6034A	Kit of 20EA 1.4 Volt mercury batteries
60-855262	1.5 volt carbon zinc battery kit consists of 1 battery type 904 or NE or 716 (Replaces NEN-6030A)

Monitor Receivers Accessories

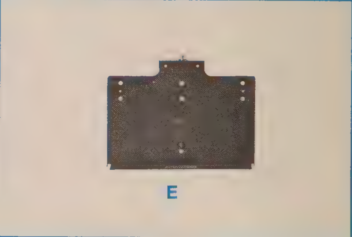


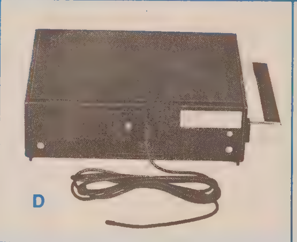


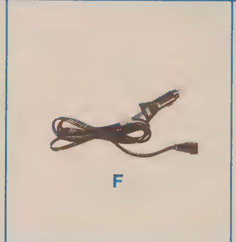
Alert Monitor FM Receiver

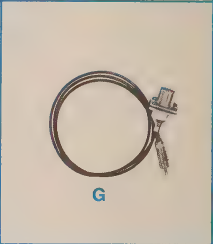


"Fire Fighter" FM Receiver









Emergency Power Supply Kit

A Emergency power supply kit contains nickel-cadmium battery, battery charger and automatic switchover circuit. When 117 VAC or 12 VDC primary power is lost, emergency power supply automatically cuts in. Typically provides 20 hours' operation per 16 hour charge. Automatically recharges when radio is connected to primary power source.

NLN-1082A Emergency Power Supply Kit

Antennas

Flexible Whip

B Whip antenna stands up straight, snaps back. Plugs into external antenna jack on rear of receiver.

NAD-6200A	VHF, 150.8-174 MHz
NAE-6105A	UHF, 406-420, 450-470 MHz

Telescopic (Alert Monitor only)

C Telescopic antenna provides protection when receiver's being carried. Collapses into handle. Pulls out, swivels up and telescopes upward. Attaches to antenna receptacle on handle (Alert Monitor only).

NAD-6190A VHF, 150.8-174 MHz

Dribble

D Dribble antenna hangs down out of way. Plugs into external antenna jack on rear of receiver.

85-83600G01	VHF, low-band, 30-42 MHz (Replaces NAB-6191)
85-83600G02	VHF, low-band, 42-54 MHz (Replaces NAB-6192A)

Mobile Operation Accessories

Mounting Rack

E Mounting rack ideal when using receiver while driving. Rack mounts under dash and securely holds radio.

NLN-6588A Rack

DC Power Cable

F DC power cable plugs into cigar lighter and external power jack on rear of receiver for mobile operation in or out of mounting rack (12V dc, negative ground only).

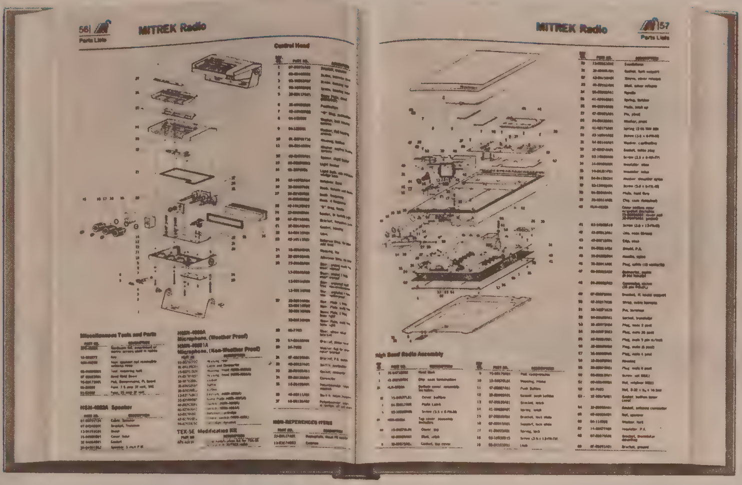
30-83562E03 (Replaces NKN-6123A)

Antenna Adapter Cable

G Mobile antennas provide extended range in mobile operation. Antenna adapter cable connects mobile antenna to rear jack on receiver.

NKN-6131A Adapter Cable

Parts and Data Handbook


56
MITREK Radio
Parts Lists
Control Head
Miscellaneous Tools and Parts
MITREK Radio
57
Parts Lists
High Band Radio Assembly

Representative pages from the
Motorola Communications Parts and Data Handbook.

A handy digest of common, basic data required on a daily basis by the communications maintenance technician in the servicing of Motorola communications products.

The rugged hard cover book, bound in simulated leather contains sections on general data required in the analysis or modification of communications circuits or systems; on specific parts lists, "exploded" views and cross-reference charts relating to specific products and accessories; and a condensation of replacement parts specifications and applications.

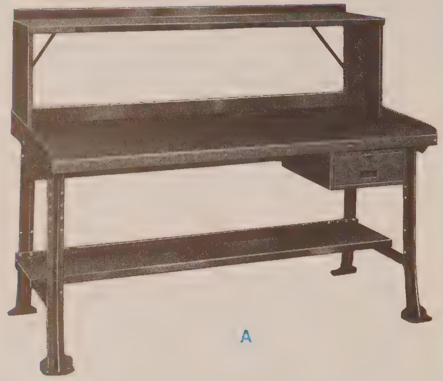
Some of the many products included are MITREK Radios, MICOR Radios, HANDIE-COM Radios, MT-500 series Radios, DIMENSION IV Pagers, SPIRIT Pagers and METRX Pagers, plus antennas, base stations, car telephone, CCTV and many more.

An invaluable addition to the Communications Service Shop!

RAX-4001A Parts and Data Handbook

MOTOROLA INC.
Communications Parts & Data Handbook

Service Bench and Accessories For the Shop and Service Van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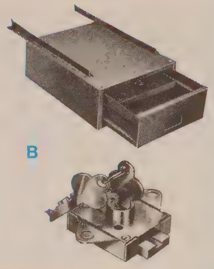
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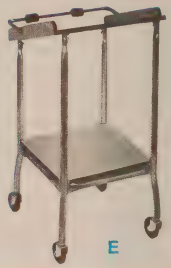
E

Steel Service Bench

Order This Complete Package Today!!!

- Bench with pressed wood cover over top, steel bottom shelf and stringer.
- Back & end stops which when fastened to back and ends of bench, guard against equipment and tools slipping off work surface. Back stop extends 3″ above top . . . end stops taper to 1½″.
- Riser with 2″ backstop for holding test equipment. Bolts upright to bench. (Dimensions . . . 18″ high, 14″ deep).
- Electrical outlet strip with 7 sockets. Wired to carry 15 amps at voltages up to 125.
- One bench drawer. Operates on ball bearing rollers within its own complete case. Has automatic stops and sliding drawer tray. Overall dimensions, 15¾″ wide, 20″ deep, 6¾″ high.

A Tailor made for the 2-way radio service shop . . . provides extra room for test equipment and other servicing tools both on top and under riser. Bench top measures 72″ long by 34″ wide — provides plenty of uncrowded space for mobile unit repairs. Bench and accessories are drop shipped from supplier. Price does not include shipping charges.

ST-176	Service Bench Complete
ST-177	Bench only, less riser, back, end stops, drawer and outlet strip
ST-178	Back and end stops only
ST-179	Bench riser only
ST-180	Electrical Outlet Strip only

Bench Drawer and Lock

B Same drawer as supplied with bench above. Flat key lock is easily installed through knock-out holes in bench drawer faces. Two keys supplied.

ST-181	Bench Drawer
ST-190	Flat Key Lock

Bench Stool and Seat Cushions

C Stool has pressed wood cover over steel seat. Stands 26″ high. High quality back and seat cushions add complete comfort to Steel Stools. Cushion is ¾″ shredded foam rubber with long lasting, vinyl plastic cover. Back cushion slips over stool back. Seat cushion is secured to stool seat with four sturdy snap buttons.

ST-189	Stool, less Cushions
ST-469	Back Cushion
ST-470	Seat Cushion
ST-499	Seat & Back Cushion Set

Steel Service Cart

D This handy worksaver is ideal for moving mobile units from a vehicle to the shop bench, for gathering or moving parts, test equipment and other servicing aids around the shop.

Cart measures 30 inches long, 16 inches wide by 32 inches high. Rugged pan-type metal shelves are 3 inches deep and welded to the sturdy tubular metal cart frame. Cart rolls smoothly on 5 inch diameter rubber-composition wheels. Rear wheels are swivel-type for easy maneuverability. Unit is supplied knocked down with complete assembly instructions included.

ST-418	Metal Service Cart

Instrument Cart

E This ST-1152 Instrument Cart features a slanted top to support the instrument at a convenient viewing angle, easy rolling 3″ rubber tread swivel casters, exclusive back support arm, tubular steel (1″ dia.) electrically welded construction, bright hot-dip galvanized finish, and phenolic plastic coated ⅝″ plywood top and shelf.

ST-1152	Instrument Cart. Dimensions: 17″ x 19″ top, 34″ high overall.

The Parts Department
of the Motorola Communications Group

Special Accounts

The specialized parts and test equipment needs of the U.S. Federal Government and the railroad, airline and telephone industries are served by a separate National Accounts group.

Service Bench and Accessories For the Shop and Service Van

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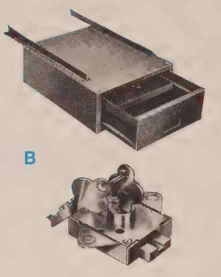
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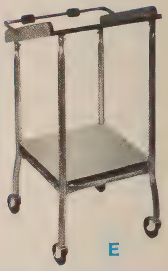
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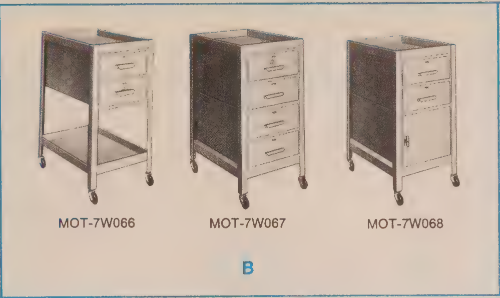
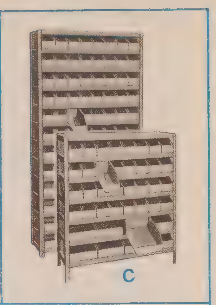
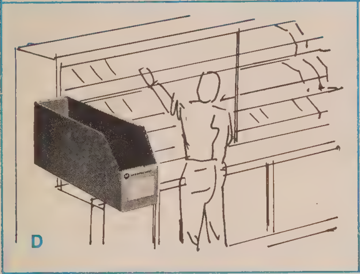
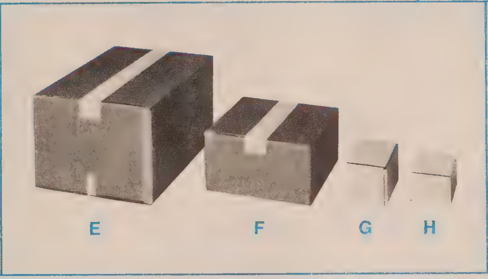
ST-1152	Instrument Cart. Dimensions: 17″ x 19″ top, 34″ high overall.









Mobile Maintenance Bench

A This unit provides the work surface of a bench and the storage area of a work cabinet. Rolls easily to the work area on large 5″ rubber casters.

The pressed wood top measures 42″ x 24″. The closed section is 18″ w x 20″ deep x 28″ high with an adjustable shelf. The drawer is 12″ wide x 3″ high x 18″ deep.

This cabinet is of welded steel, deluxe construction and is shipped fully assembled. Shipping weight 130 lbs.

MOT-1W827

Service Shop Mobile Tool Toters

B These all steel tool toters bring the tools and test equipment to the job site and provide security for tools when not in use. Drawers operate from a fully enclosed case and can be padlocked, cabinet model supplied with cylinder lock. Unit rides on 2½″ heavy duty casters. Shipped knocked down. All units 34½″ high x 18″ wide x 24″ deep.

MODEL NO.	DESCRIPTION	SHIP WT.
MOT-7WO66	2 Drawer Unit	55 lbs.
MOT-7WO67	4 Drawer Unit	85 lbs.
MOT-7WO68	2 Drawer with cabinet	71 lbs.

Bins and Shelves

C These shelving units provide quick, efficient storage capability to any service shop or stockroom. The 40 bin store-all unit is supplied with 32 four-inch and 8 eight-inch bins and a 6-shelf furniture grade steel rack. (Available less bins also). Dimensions are 40″H x 36″W x 12″D. The 80 unit racks have 64 four-inch and 16 eight-inch wide bins, with 12 shelves. The 80 bin units are deluxe commercial grade units and will give long, dependable service as they are rated at 400 lbs. per shelf. All units are shipped knocked down. The dimensions of the 80 bin units are 75″H x 36″W x 12″ or 18″ deep, gray enamel finish.

MODEL NO.	NO. BINS	BIN DEPTH	SHIPPING WT.
MOT-7WO23	40	12″	38 lbs.
MOT-7WO45	80	12″	114 lbs.
MOT-7WO60	80	18″	153 lbs.
MOT-1W763	40 bin rack less bins		29 lbs.

Stock Bins with Labels for Orderly Parts Storage

D Ideal for small parts storage on shelves or racks. Heavy duty corrugated construction assures long life. All bins are 12½″ deep. Bins are sold in lots of 25 of one type only. Shipped knocked down with separately packed labels. Easily assembled in just a few seconds.

PDK-561	2½″ wide x 4½″ high
PDK-562	4″ wide x 4½″ high
PDK-564	4½″ wide x 5½″ high
PDK-563	6″ wide x 4½″ high
PDK-565	9″ wide x 5½″ high
PDK-566	18″ wide x 5½″ high

Shipping Cartons

Standard Shipping Cartons shown are of heavy duty corrugated construction. (No markings) Keep a supply on hand for your every day packaging needs. Cartons "E" & "F" are brown and "G" & "H" are white corrugated construction.

Due to size cartons "E" and "F" must be shipped by motor carrier (truck) and are subject to minimum shipping charges of from $7.50 to over $20.00 depending on distance from warehouse. Economics dictate that these cartons be ordered in large quantities to defray these minimum costs. Supplied in packs of ten.

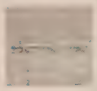
Pt. No.	Figure	Size
PK-739	E	(20x14x10)
PK-740	F	(12x12x6)
PK-741 (self-seal)	G	(6x4x4)
PK-742 (self-seal)	H	(5x4x3)

Tape

I Ideal for assembling corrugated cartons and sealing boxes.

11-125650	3″ Gummed Paper Tape 600Ft/Rl.
11-124934	½″ Masking Tape 180Ft/Rl.

Cabinets and Tube Caddies



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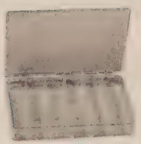

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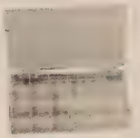

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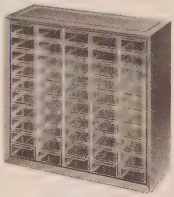

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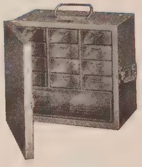

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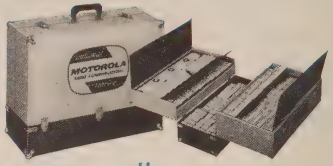

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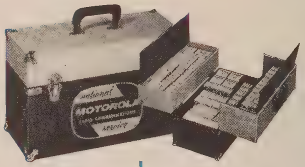

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Plastic Parts Boxes

A-E Useful assortment of high-temperature polystyrene boxes, for keeping small items neatly sorted for fast availability. All have mold-formed hinges except ST-574 which has metal hinges.

Pt. No.	Fig.	Qty.	Compartments Size
56-866983	**A**	4	1½″x1⅝″x1⅛″
		3	1″x4″x1⅛″
56-866984	**B**	12	1″x1⅝″x1⅛″
ST-703	**C**	6	6″x1⅝″x1⅛″
ST-573	**D**	1	10½″x2⅝″x1½″
		6	1⅜″x1¾″x1½″
		6	2″x1¾″x1½″
ST-574	**E**	18	2″x1¾″x2″

Utility Cabinets

F ST-1098 provides 50 "see-thru" drawers to help you organize and protect hardware and electronic components. Full size 2¾″ W. x 1¼″ H. x 5¾″ L. styrene drawers in a 16″ W. x 15″ H. x 6½″ L. heavy-duty steel frame with a metallic blue baked enamel finish, dividable drawers.

ST-1098 Cabinet

G Here's a handy cabinet that can be hung on the wall or set on the bench and it's portable too. Ruggedly built of fine grade steel, the cabinet has 12 small drawers with dividers and one large drawer with a movable divider. Has front closure door with lock and key. Size, 10″ x 5¾″ x 9″.

ST-411 Cabinet

Motorola Tube and Tool Caddies

H Roomy enough to hold up to 300 tubes of various types and sizes and has special compartment to accommodate sundry tools and parts. Has button down covers on each wing section to prevent tubes from falling out when case is opened. Lightweight and ruggedly built for long life. Closed size is 22″ x 9¼″ x 16½″.

ST-135 Tube Caddy

I Accommodates an assortment of 150 tubes. Provides more than ample room for carrying basic tube requirements needed for any servicing job. When case is open, all tubes are easily accessible and in plain view. Closed size is 16¼″ x 8½″ x 11¾″.

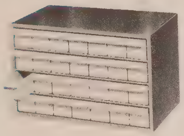
ST-136 Tube Caddy

J Ideal for on-the-spot or in-shop service. Holds soldering gun and many other tools in base of case. Has separate and removable tray for parts and tools as well as tool space in cover. Closed size is 16½″ x 7⅜″ x 9¾″.

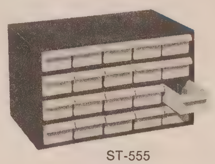
ST-137 Tool Caddy

Akro-Mils Parts Storage Cabinets

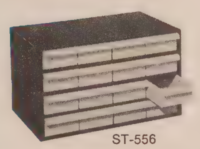
Frame Size 18″ W. x 11″ H. x 11″ L.



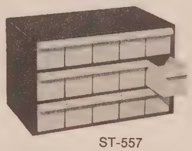
ST-1095



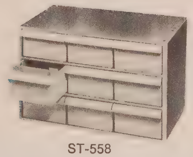
ST-555



ST-556

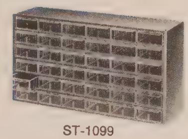


ST-557

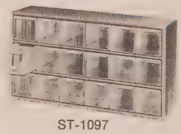


ST-558

Frame Size 18″ W. x 6″ L.



ST-1099



ST-1097

Heavy-Duty Welded Steel Frame. Molded Styrene Drawers—8 sizes. Compact Modular Cabinet.

Store:	Small Parts, Electronic Components, Hardware, Tools.
Save Time:	Instantly locate parts and supplies.
Save Space:	Pick the right drawer for your requirements, compact modular cabinets are only 18″W. x 11″H.
Versatile:	Stack horizontally or vertically, wall mount, place on carts or shelves.

Heavy-Duty Steel Frame Cabinet

Charcoal gray baked enamel finish, steel drawer supports, nesting "feet" for stability in stacking.

Two Types Molded Styrene Drawers

Gray Heavy-Duty

Virtually unbreakable, guaranteed for life, will not crack, break, or dent.

Transparent

See-thru for quick visual checks; medium duty. Styrene drawers are lightweight; rust and corrosion proof; safe, no sharp edges; spill proof, retaining tab holds open drawers.

Dividable

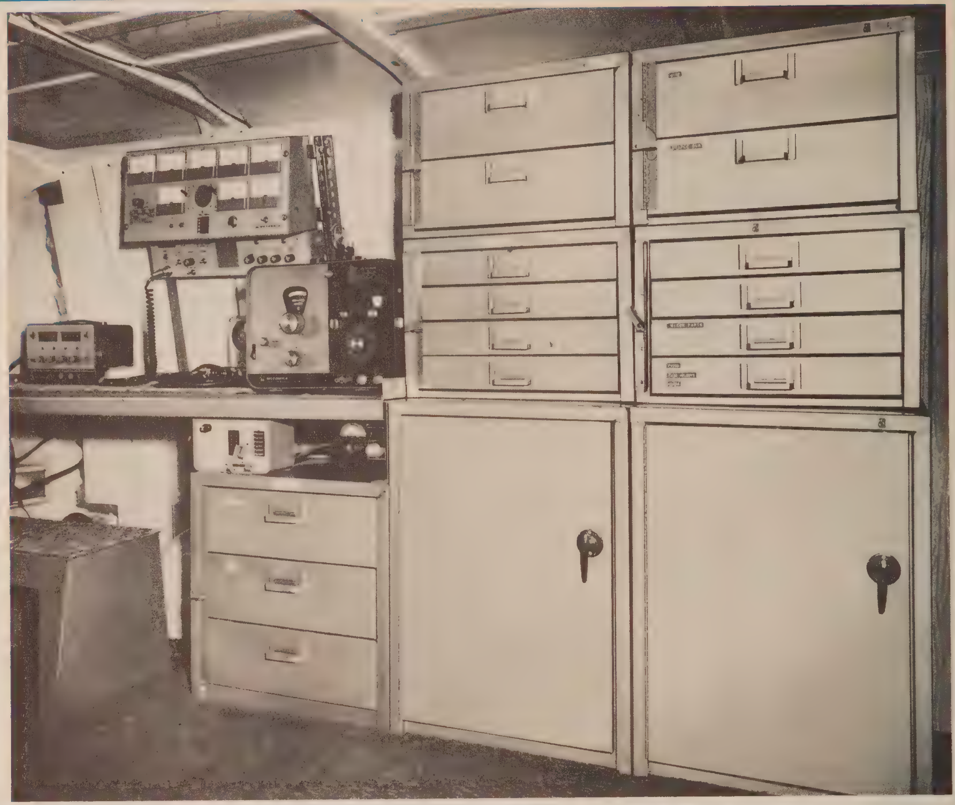
All drawers can be partitioned into subcompartments. Patented locking dividers won't creep or slip.

Cabinet Order Reference

Cabinet No. Trans. Drawers	Cabinet No. Gray H. D. Drawers	Drawers Per Cabinet	Drawer Size Inches W	Drawer Size Inches H	Drawer Size Inches D	Ship. Wt. Lbs.	Extra Dividers in packages of 25
ST-1099		36	2¾	1¼	5⅞	12	**64-84203D90**
	ST-1095	28	2⅛	2⅛	11	22	**64-84203D88**
ST-1097		18	2¾	2½	5⅞	10	**64-84203D89**
	ST-555	20	3⅛	2⅛	11	21	**64-84301A80**
	ST-556	16	4	2⅛	11	20	**64-84301A81**
	ST-557	15	3⅛	3 1/32	11	20	**64-84301A82**
	ST-558	9	5¼	3 1/32	11	18	**64-84301A83**

One cross divider per drawer furnished

Customized Interior for Service Vans



TAKE A COMPLETE SERVICE SHOP RIGHT TO THE JOB

When you customize your vehicles with this easily installed kit, you not only make maximum use of your van's interior space, you take an organized and efficient service shop right to the customer.

Twenty gauge steel drawers and cabinets are provided in a variety of sizes. The smaller drawers are ideal for storing resistors, capacitors, and small tools. Slide dividers enable the making of drawer configurations to most effectively hold tubes, kits and other servicing components. Large cabinets, with shelves, are ideal for larger tools and test equipment. The workbench is constructed of 14 gauge metal with a ¼" masonite top and has a ten inch shelf above it for permanent installation of larger and more frequently used test equipment. Locks are provided on all doors and cabinets for safety and equipment protection while the vehicle is in motion. A sturdy technician's stool is provided and all equipment is finished in a blue-gray hammertone.

ST-685/110 or /125 Wheel Base.* Bench and cabinet kit for all Chevrolet and GM vans. From 1966 to current models.

ST-800/105.5 or /123.5 Wheel Base.* Bench and cabinet kit for Ford Econoline models. From 1966 to current models.

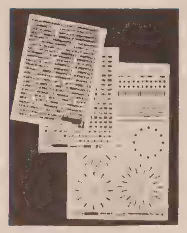
ST-956/109 or /127 Wheel Base.* Bench and cabinet kit for Dodge vans. From 1966 to current models.

Cabinet layout may vary from photo depending on vehicle. Electrical box and wiring not included in any of the above.

IMPORTANT: Specify exact year, make, model and wheel base of vehicle with order.

*Number following model is wheel base.
For example—Ford 123.5" wheel base would use a ST-800/123.5.

Photos represent typical installations. Actual installation differs depending on make and wheelbase of van.



Instant Lettering Dry Transfer Marking Kits

Instant lettering Kits are easy to use. Just apply "Instant Lettering" sheet over portion of chassis to be printed and rub gently over sheet for transfer of letters or numerals on a given area. That's all there is to it.

With these two Kits you can completely mark electronic equipment from component parts to complete panels and chassis. Researched to give you up to 95% of all Electronic panel markings. All letters and numerals are ⅛" high.

Titles for Electronic Equipment

Kit contains 24 - 3"x5" sheets with multiples of hundreds of preset words (ranging from AC to ZOOMS). This set also contains sheets of Alphabets and numerals.

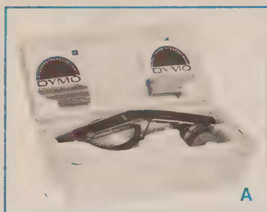
ST-676 Titles.

Meter and Dial Marking Kit

Kit contains 12 - 4¾" x 7¼" sheets of arcs, dial patterns, lines, dots, wedges, switch symbols, graduation lines, alphabets and numerals for marking standard and special rotary tap switches, potentiometers, and especially calibrated meter dials. The sheets are in black, white and red colors.

ST-674 Marking Kit.

Shop Supplies



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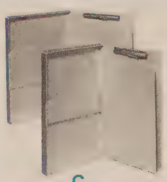
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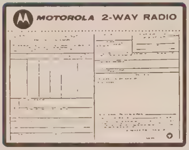

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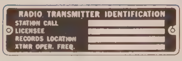

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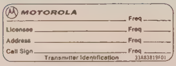

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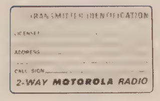

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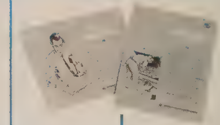
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Dymo Tools

Dymo Touch-Action Tool 'N Tape Kit—½", ⅜" Tape

A An instant information system packed in convenient Deluxe Custom Molded Carrying Case. Embosses both ½" and ⅜" Dymo tape, in new easier-to-read extended letters. Dymo's exclusive togmatic embossing action makes labelmaking a soft touch. Kit includes 1570 Labelmaker with .200" and .180" horizontal embossing wheels, a .160" vertical wheel and one roll each black ½" tape and red ⅜" tape. Compact and complete, this kit is engineered for long, hard service.

ST-971 Dymo Touch-Action Labeling Pack

Dymo Touch-Action Tool 'N Tape Kit—⅜", ¼" Tape

B Everything you need in one handsome Deluxe Custom Molded Carrying Case. Practical way to invest in labeling equipment. Kit includes one 1550 Touch-Action Tapewriter, .180" and .145" horizontal embossing wheels, a .160" vertical embossing wheel and one magazine each of ⅜" black vinyl tape and ¼" red vinyl tape.

ST-972 Dymo Touch-Action Labeling Pack

Replacement Tape Color and Part Number Ordering Chart

COLOR	¼" SIZE (12')	⅜" SIZE (12')	½" SIZE (12')
Black	ST-729	ST-739	ST-750
Red	ST-730	ST-740	ST-751
Blue	ST-731	ST-741	ST-752
Green	ST-732	ST-742	ST-753
Fluorescent Red	......	......	ST-761

Service Pad Holders

C Protect service pads and carbon copies of receipts, work orders, and other maintenance records with this handy holder.

ST-681	Service pad holder 5½" x 9"
ST-1162	Service pad holder 9" x 12½"

Post Binder

D Important reference material, literature and other valuable papers are easy to find when you keep them together and close at hand in this handy Post Binder. Expandable to 3¼", this Binder will accommodate loads of material that may be lying loose in a drawer or on a shelf right now. Order one or more today to streamline your work organization.

ST-439 Post Binder

FCC License Frame

E An attractive, leatherette covered hard-back frame with a clear plastic front to provide full, easy-to-read display of your 2-way radio license. Frame has grommet hole at top-center for easy hanging. License fits snugly in special flap-type plastic pocket. Measures 8½" x 6⅝".

54-82773B01 License Frame

Transmitter Identification Tags

F Transmitter identification nameplate for affixing to mobile or base station equipment. Supplied with 2 mounting screws. Information can be applied to plate with metal stamps or with a metal writing tool. Burgess Vibra tool is ideal for this purpose.

SK-9422 Nameplate

G Attractive aluminum foil, adhesive backed, I.D. tags that can be affixed quickly and easily to any surface. No water or glue . . . just write or type in the necessary information on the tag, peel off the paper backing and place on the transmitter. Tags measure 3" x 1".

33-83819F01 (Pack of 6)

H Attractive 2-color adhesive backed I.D. tags that can be affixed quickly and easily to any surface. No water or glue to bother with . . . just write or type in the necessary information on the tag, peel it off the paper backing and place on transmitter. Tags measure 2½" x 1½".

54-82256B31 (Pack of 10)

Radio Station Operating And Maintenance Log Books

I The Motorola Radio Station Operating and Maintenance Log Books are the ideal way of keeping records of operating data and maintenance performed on your radio system as required by the FCC.

The operating log book basically consists of 27 operating data pages and 7 pages of antenna tower and light inspections records.

The maintenance log book consists of 25 radio maintenance record sheets enclosed in a protective jacket. One of these sheets should be filled out each time a technician makes required periodic measurements or repairs to your equipment and maintained in your files as required by FCC regulations.

68-83150D52	Operating Log Book (same as TIC-3110A)
68-83150D53	Maintenance Log Book (same as TIC-3111-1)

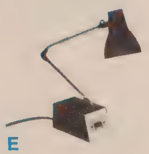
Power Tools and Electrical Accessories

A

B

C

D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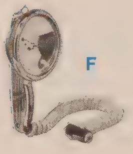
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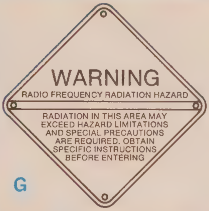

WARNING
RADIO FREQUENCY RADIATION HAZARD
RADIATION IN THIS AREA MAY EXCEED HAZARD LIMITATIONS AND SPECIAL PRECAUTIONS ARE REQUIRED. OBTAIN SPECIFIC INSTRUCTIONS BEFORE ENTERING
G

Illuminated Magnifying Glass

A Magnifying Glass—Ideal for visual accuracy on printed circuit work. Provides excellent magnification and cool, shadow-free light to increase precision during intricate operations and inspection. Unit has 45″ reach, 360° sweep, and 5″ diameter, 3 diopter optically ground glass lens. Unit is portable and UL approved.

ST-1355	Magnifying Glass (220v)
ST-652	Magnifying Glass (110v)
ST-683	22 Watt Repl. Bulb
ST-636	Replacement Mtg. Clamp

B Magnifying Lens Attachment — Boost your magnification power eight times over that provided by the ST-652 or ST-1355 lamp through the use of this quickly-attached lens accessory. Simply snap it into place between three metal clips. Two tension springs included allow for extra weight and replace the ones now on the lamps. For older lamps without the clips, you can order the ST-578 Lamp Head Assembly.

ST-575	Lens Attachment w/2 Springs

Fluorescent Lamp

C Fluorescent Lamp—Excellent quality, all-purpose bench lamp. Has a clamp for simple desk, bench or table mounting. Fully adjustable. Has push button starter and 19 x 4½″ shade. Supplied with two 15 watt bulbs.

ST-653	Fluorescent Lamp
ST-684	15 Watt Repl. Bulb
ST-636	Replacement Mtg. Clamp

Burgess Electric Vibro-Graver

D Engraves permanently on steel, aluminum, brass . . . practically any material. Ideal for marking mobile and base station identification plates . . . labelling parts bins, tools or any item that requires permanent identification.

ST-188	Vibro-Graver
ST-465	Carbide Tip

Tensor Light

E Tensor lights are cool, white and glare free . . . just the thing for bench servicing of miniature equipment. Equivalent in brightness to 200 watt conventional desk lamp. Light concentrated directly on the job provides the best working conditions. Fully adjustable arm and shade, hi-lo switch and extra long cord. Bulb is General Electric #93.

ST-677	Tensor Light

Emergency Spot Lamp

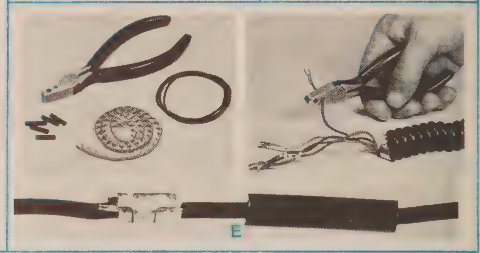
F Plugs into cigar lighter of vehicle. Provides 57,000 candle power beam with current drain of only 3.6 amps. Built to take rough handling in all kinds of weather . . . just the thing for illumination in emergencies.

ST-579	Spot Lamp (12V Only)

OSHA Radio-Frequency Radiation Warning Sign

G You are legally responsible for compliance with OSHA (Occupational Health and Safety Administration) RF radiation regulations. This sign is offered to aid you in meeting these regulations. The sign is constructed of aluminum alloy and measures approximately 8″ square.

33-83198L01	Warning Sign



Heat Gun...A Useful Tool

A Think of the many times you could have used fast and flameless heat around the shop, garage and on the job and you will find a place for this versatile, fast heating unit. Use it for insulating critical components, solder joints and wire splicing. Use it for drying out moisture in radio housings and chassis. It can be used for heating of aluminum, copper tubing and plastics to facilitate bending. Its use extends outside the shop into the garage. This gun will easily defrost windshield, open frozen pipes and radiators, melt ice and tar.

An adjustable air intake enables controlling of air blast temperature. The heater housing is double jacketed and the entire unit is contained in a sturdy die cast aluminum housing with an eight foot grease resistant cord.

CAUTION: A steady application of heat from this gun could damage insulation on components and wiring and will melt selenium.

ST-697	Heat Gun
ST-700	Nozzle Adaptor
ST-701	Baffle Plate (For shrink tubing up to ¾″ O.D.)
ST-702	Baffle Plate (For shrink tubing up to 1¼″ O.D.)
ST-902	Replacement Element for Gun

Shrink Tubing Kit

B For insulating wires, transistors, diodes and other components.

Easy to use and effective in operation, this kit enables you to insulate wire splices and critical components from near shorts. Any component up to ⅜″ in size can be covered. A short blast from the heat gun (above) quickly and neatly shrinks the tubing around the component which forms a snug and protective insulation covering. Ten sizes, from 1⁄16 to ⅜″ I.D., are provided with a total of 84 pieces making up the kit. All tubing is 6″ long and is packaged in separate bins in a plastic box, identified by Motorola part numbers.

PDK-1115	Shrink-tubing kit

Wire Terminal Kit

for Plugs and Connectors

C This kit, with more than 400 terminals of twelve different shapes, enables you to replace contacts in plugs and connectors found in Motorola equipment. This kit includes mating male and female wire terminals, fasten lugs, terminal pins and connector contacts.

PDK-296	Terminal Kit

Extractor Tool

D This automatic extractor tool enables you to remove broken, or loose wire terminals from damaged plugs or connectors. Simply slip the barrel of the tool over the terminal, press in, and a pin releases the terminal from the base, without damaging the connector.

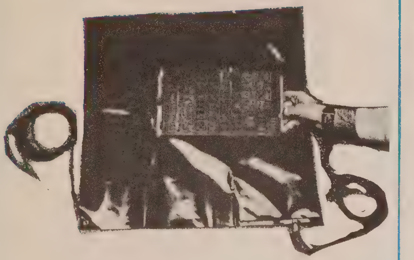
ST-946	Automatic Extractor Tool (.093 dia. pin)
ST-1145	Automatic Extractor Tool (.062 dia. pin)

New Crimping Pliers

E This kit, complete with solderless terminals, wire and crimping pliers, simplifies repair of tinsel coil cords. Solid or stranded copper lead wire can be attached to tinsel type cable conductors or spade lugs resulting in a clean solderless connection. Extra terminals, lugs and sleeves are available.

ST-662	Crimping tool kit
29-847033	Spade Lugs
29-847034	Solderless terminals
37-847035	Terminal Cover Sleeve

MOS Protection / Folding Hand Truck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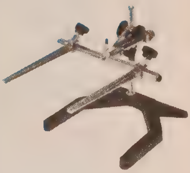
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Electrostatic Protection of MOS Integrated Circuit Devices

A Many integrated circuit devices of the MOS (Metal Oxide Semiconductor) type are used in communications equipment. Because of the high open circuit impedance of MOS IC's, extreme care must be taken to protect against damage from electrostatic discharge in handling them and servicing the printed circuit boards in which they are used.

Electrostatic discharge produces not only complete destruction of MOS devices but may also produce latent degradation that results in limited life and premature failure in the future. Even though protection devices are provided in MOS IC's, this protection is normally effective only against overvoltage in the hundreds of volts range as are encountered in an operating system.

Static electricity is always present in the environment. A person working at a service bench, sliding around on a stool, or walking across a floor can develop a potential of many thousand volts. Motorola offers a complete line of servicing and handling materials which provide effective alternate paths to ground or to bleed off potentially damaging charges.

Electrically conductive plastic foam and bags are ideal for storing and transporting MOS IC's and the printed circuit boards in which they are used. A complete portable field service kit is available to protect against electrostatic discharge either when working on a service bench or when servicing printed circuit boards in the field.

The portable field service kit consists of a bench top covering, a wrist strap and a ground cord. The bench top covering is made of conductive plastic and incorporates pouches for carrying the wrist strap and ground cord. It also serves as an ideal wrapping for carrying printed circuit boards. The wrist strap uses a velcro fastener to provide a comfortable but snug fit. The 15-foot ground cord bonds the bench covering and wrist strap to an electrical ground by means of an alligator clip and incorporates a one megohm resistor to limit current to a safe value. A separate wrist strap is also available for use with other types of conductive, grounded bench tops.

RSX-4014A	Portable Field Service Kit (includes bench top cover, wrist strap and ground cord)
ST-1191	Conductive Wrist Strap (for use with conductive, grounded bench tops)
56-83801K01	Conductive Foam, 1⅞"x1"x⅝"
56-83350K01	Conductive Bag, 16"x12"
56-83350K02	Conductive Bag, 8"x5"
56-83350K03	Conductive Bag, 10"x5"
56-83350K04	Conductive Bag, 10"x6"
56-83350K07	Conductive Bag, 12"x8"
56-83350K08	Conductive Bag, 5"x4"

Folding Hand Truck

B This convenient folding hand truck is ideal for transporting tool kits, parts, and test equipment to servicing locations. Hinged handle locks into place during use. Nose bar may be placed in either up or down position depending on depth of load. Truck folds to 24" H x 17" W x 12" D dimensions for easy use from an automobile truck, station wagon, or service van. The unfold dimensions are 43½" H x 17½" W x 20" D with handle and nose bar extended.

The frame's all-welded construction is formed from ⅞" O.D. x 16-gauge steel tubing. Stair glides are made from steel channel for easing loads down stairs or curbs. A vinyl hand grip gives positive load control. Each unit comes equipped with easy rolling 5" diameter solid rubber ball bearing wheels. The weight of truck is only 18 pounds with a load capacity of 200 pounds.

RSX-4013A Folding Hand Truck

Circuit Board Holder

C This low cost, light weight circuit board holder, supplied with mounting base, features superior quality and flexibility. The device is specifically designed to hold circuit boards during servicing and can be adjusted to hold boards up to 8 inches wide over a wide range of positions. Spring loaded jaws allow for quick change of boards and allows jaw assembly to be quickly adjusted to various detent positions.

RSX-4023A Circuit board holder

Attache Tool Kit

This tool kit includes a broad assortment of tools especially selected for the service of communications, data processing, and other complex electrical equipment. The assortment includes an extensive array of pliers, screwdrivers, nutdrivers, sockets, and wrenches. Special purpose tools such as contact burnishers, feeler gauges, flashlight, Anglo/Metric calculator and bolt cutters are also included.

The molded carrying case is equipped with two handy pallets for securely holding and storing all of the tools.

An optional (T-1017A) miniature VOM, see Buyers' Guide Test Equipment section for complete features, can be supplied with the tool kit.

ST-1188	Attache Tool Kit
ST-1188/220V	Attache Tool Kit with 220V soldering iron
PK-821	Attache Tool Kit with VOM
PK-821/220V	Attache Tool Kit with VOM and 220V soldering iron

These tools are included in the kit:

Alignment Tools, 2 pcs
Burnisher Contact, Set of 3
Calculator, Anglo/Metric
Center Punch, 3⁄32″
Crimping Tool with Bolt Cutter
Feeler Gauge, 26 Leaf
Flashlite, 2 D-Cell
Hammer, BP 4 oz
Hex Key Set 6 pc. 050-⅜
Handle for Driver Blades
Handle, "G"
Knife, Electrician
Mirror, Inspection
Nutdriver, Blade, 3⁄16″
Nutdriver, Blade, 7⁄32″
Nutdriver, Blade, ¼″
Nutdriver, Blade, 9⁄32″
Nutdriver, Blade, 5⁄16″
Nutdriver, Blade, 11⁄32″
Nutdriver, Blade, ⅜″
Nutdriver, Blade, 7⁄16″
Nutdriver, Blade, ½″
Oiler
Pin Punch, 1⁄16″
Pin Punch, ⅛″
Plier, Diagonal, 5″
Plier, Chain Nose, 4½″
Plier, Long Nose with Cutter
Plier, Mini Shear
Plier, Retaining Ring, External & Internal
Plier, Rib Joint, 10″ 2 ea.
Rule 6″ w/Gauge
Screwdriver, Jewelers, 6 pcs.
Screwdriver, Offset
Screwdriver, Phil 0 Blade
Screwdriver, Phil 1 Blade
Screwdriver, Phil 2 Blade
Screwdriver, Phil., Stubby 2″
Screwdriver, Reg. 3⁄32 x 2″
Screwdriver, Reg. ⅛ x Blade
Screwdriver, Reg. 3⁄16 x Blade
Screwdriver, Reg. ¼ x Blade
Screwdriver, Reg. 5⁄32 x 4″
Screwdriver, Reg. 5⁄16 x 6″
Screwdriver, Reg. Stubby ¼ x 1″
Screwdriver, Screw Holding
Spline Driver Set
Scissor, Electrician
Scribe
Spring, Hook-Pull
Soldering Iron
Solder Aid Set
Solder, 60/40, .032″
Tweezer, Reverse Action
Tweezer, General
Wire Stripper
Wrench, Adjustable 4″
Wrench, Adjustable 8″
Wrench Set, OE (6)
Wrench Set—¼″ Drive Socket
Holder
Case, Molded

Soldering Equipment

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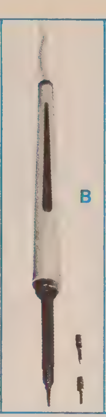
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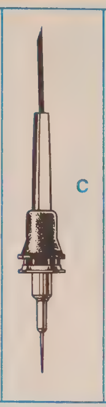
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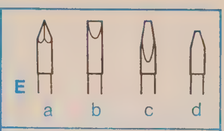
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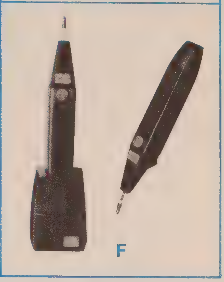
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WELLER Soldering Station

Automatically controls output temperature. Ideal for printed circuits.

- **Non-burnable Silicone Rubber Cord**
- **Minimized Tip Freezing**
- **Fast Recovery**
- **Cool Handle**
- **1¾ oz. Pencil Iron**
- **Long Life, Iron Plated, Anti-Oxidation Coated Tips**

A Weller low voltage controlled output soldering station incorporates exclusive "Magnastat," "curie point" closed loop control system. Desired temperature is selected simply by changing heat sensing tip. Power unit features on/off switch, red indicator light, receptacle for tip cleaning sponge, and convenient non-sinking (no heat loss) tool stand. 3-wire cord, 120 V, 50/400 Hz, 60 W. Furnished with 3/16", 700°F screwdriver tip. Tip number ST-1088 (1/32" conical flat, 5/8" reach 800°F) or ST-1167 (screwdriver, 1" reach, 800°F) are recommended for Motorola portable equipment.

ST-1087	Weller W-TCP-N soldering station
ST-1088	1/32" conical flat, 5/8" reach 800°F tip
ST-1167	Screwdriver, 1" reach 800°F tip

UNGAR Lightweight Iron for Precision Soldering

B Lightweight soldering iron especially designed for precision soldering in micro-electronic circuitry. Iron comes complete with 10 watt heat capsule, delivering 575°F to 650°F tip temperature and 3 replaceable tips.

ST-916	"Ungar" model #9675 soldering iron & tip
ST-917	"Ungar" model #6910 replacement heat element 10w
ST-919	"Ungar" model #6950 replacement pencil tip, 1/8" thread in
ST-920	"Ungar" model #6951 replacement screwdriver tip 1/8" thread in
ST-921	"Ungar" model #6952 replacement spade tip 1/8" thread in

UNGAR Popular Standard Model

C Standard model comes with 50 watt heating element delivering 800°F tip temperature. Handle has comfortable cork handle and stainless steel heat deflector.

ST-648	Soldering iron with 50 watt screw-in element and 1/8" chisel tip
ST-1174	Replacement 1/4" chisel tip (Ungar #4039).
ST-645	50 watt replacement element "Ungar" #4035
ST-643	Replacement tip (pointed) "Ungar" #PL338
ST-644	Replacement tip (chisel) "Ungar" PL333 1/8" chisel tip
ST-646	Replacement handle (less element) "Ungar" #776, UL listed 2-wire line cord

HEXACON Industrial Irons

D Ideal for printed circuits and miniature equipment. 3" reach—weighs only 2 oz. —cool handle.

ST-472	40 watt iron complete less tip
ST-473	50 watt iron complete less tip
ST-1144	60 watt iron complete less tip
ST-474	Copper tip (Std duty)
ST-484	Replacement element for ST-472 (40 watt)
ST-485	Replacement element for ST-473 (50 watt)

3/16" Diameter Tips Plated Iron For Hexacon Irons

E Non-freezing tips, pre-tinned and ready to use. (Long-life type)

PART NO.	STYLE	POINT	LENGTH
ST-475	(a)	1/32x1/32	2-1/4
ST-476	(b)	3/16x1/32	2-1/4
ST-477	(c)	3/32x1/32	2-1/4
ST-478	(d)	3/16 dia.	2-1/4
ST-479*	(a)	1/32x1/32	2-1/4
ST-480*	(b)	1/8 x1/32	2-1/4
ST-481*	(c)	1/16x1/32	2-1/4
ST-482*	(d)	1/32 dia.	2-1/4

*Tip turned down to 1/8" Diameter. For use in miniature printed circutry.

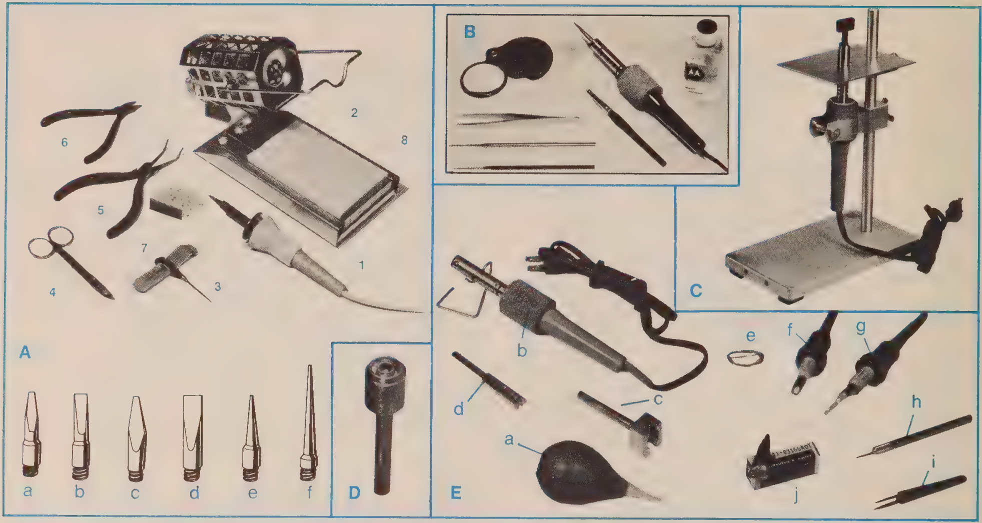
Cordless Soldering Iron by WAHL

F The Wahl "Iso-Tip" Cordless Soldering Iron is powered by long-life nickel cadmium batteries giving tip performance up to 50 watts with over 700°F. tip temperature.

Pressing the button gives you soldering heat in 5 seconds plus a built-in work light on the working area. Pilot light, too —only 8 inches long with tip and weighs just 6 ounces. "Iso-Tip" carries enough power for about 20 to well over 150 consecutive joints, depending on wire size, without recharging. It automatically begins recharging when replaced in its own charging stand.

ST-1109	Soldering iron with stand
ST-1110	Replacement tip
ST-1111	Accessory Fine Tip
ST-1185	Charging stand only

Soldering Equipment



Portable Radio Repair Tools

A A complete assortment of tools for portable radio repair.

MODEL NO.	FIG.	DESCRIPTION
ST-815	1	Soldering Iron 20W (less tip)
ST-816	2	Soldering Iron stand and pad consisting of: 1-ST-817-Holder 1-ST-818-Pad and base 1-ST-819-Wire guard
ST-864	3	Finger pick
ST-865	4	Wire cutter
ST-866	5	Miniature offset pliers
ST-867	6	Miniature cutters
ST-826	*	Replacement 20W Element for ST-815
ST-827	*	Replacement case for ST-815
ST-830	7	1x1x¼ Tip sponges for ST-815 (Pack of 12)
ST-1148	8	4½x3x⅞ Tip sponge for ST-816

*Not shown

Soldering Iron Tips for ST-815

MODEL NO.	STYLE	DESCRIPTION
ST-820	a	3⁄16″ Soldering tip (HT654X)
ST-821	b	3⁄16″ Soldering tip (HT655X)
ST-822	c	3⁄16″ Soldering tip (HT656X)
ST-823	d	3⁄16″ Soldering tip (HT657X)
ST-824	e	3⁄16″ Soldering tip (HT658X)
ST-825	f	3⁄16″ Soldering tip (HT659X)

Printed Circuit Repair Kit

B Repair kit contains primary tools and supplies that a well equipped service station requires for servicing printed circuit wiring. The kit includes: 40 W Pencil Soldering Iron and Tip, Soldering Aid (needle point and prong type), Tweezers, Magnifying Glass, Solder, Bottle of Solvent, and Brush.

ST-639	Complete Printed Circuit Repair Kit
Consists of:	
ST-472	40 Watt Iron (Less Tip)
ST-482	Iron Tip
ST-571	Magnifying Glass
ST-492	Tweezers
ST-493	Brush
66-84253C72	Prober (Straight) (Replaces ST-494)
66-84308A27	Prober (Bent) (Replaces ST-496)
ST-572	Solvent

HEXACON Soldering Iron

C Lightweight, compact, ideal for printed circuits and miniature equipment.

ST-1144	Hexacon Soldering Iron, 60 watts, less tips
ST-1146	Stand for ST-1144
66-84208D36	Reservoir Solder Tip, for ST-1144 (¾″L x ⅛″W x ¼″ inside dimension)
66-84208D37	Reservoir Solder Tip, for ST-1144 (1 13⁄32″L x ⅛″W x ¼″ inside dimension)
66-84208D38	Reservoir Solder Tip, for ST-1144 (1 13⁄16″L x 3⁄32″W x ¼″ inside dimension)

Desoldering Tool

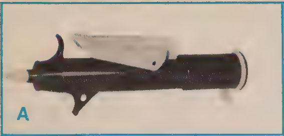
D Desoldering tool designed for removing transistors or integrated circuits with the TO-5 case. Has 3⁄16″ diameter brass shaft with copper head.

ST-892 Desoldering tool

Recommended Tools For MICOR UHF Radio Power Amplifier Repairs

E A complete complement of tools for repairing MICOR UHF Radio power amplifier and other printed circuit boards.

MODEL	FIG.	
ST-726	a	Solder remover
ST-1144	b	60 watt HEXAGON iron less tip
ST-1161	c	Special tip for ST-1144, for PA transistor removal
ST-1160	d	Special tip for ST-1144, for chip capacitor removal and replacement
PK-771	e	Silver Solder (alloy content: 1.4% Ag, 36.1% Pb, 62.5% SN) 10-10041A61
ST-1174	f	50 watt UNGAR iron with ¼″ chisel tip
ST-648	g	50 watt UNGAR iron with ⅛″ chisel tip
ST-1172	h	Modeling knife
ST-1173	i	Refill blades for modeling knife ST-1172
11-83166A01	j	WAKEFIELD thermal compound for heat sinking power transistors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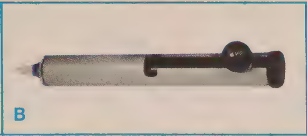
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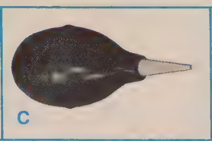
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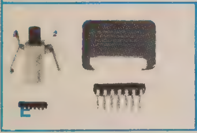
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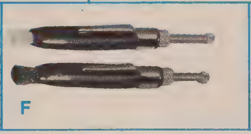
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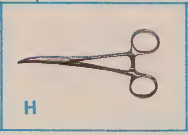
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SOLDAVAC™ Desoldering Tool

A Lightweight, easy to use tool provides ample vacuum for most routine desoldering work. For fast desoldering simply heat solder joint with iron and as solder melts, hold tip lightly against joint and press trigger. To reset, depress plunger tab by pushing against edge of bench or by placing fingers in finger supports and depressing tab with thumb.

Micro extension and mini extension tip simply slip on to existing tip and extend reach of tool with a much finer hole. Micro extension tip has a 3/32″ hole (approx.) and mini extension tip has a 1/16″ hole (approx.). Both are supplied with a convenient cleaning shaft.

ST-1091	Soldavac™ Desoldering Tool
ST-1154	Replacement Tip
ST-1165	Micro extension tip
ST-1166	Mini extension tip

PRECISTA Vacuum Desolder Pump

B Superior suction provides complete, efficient desoldering of pin terminals and connectors, terminal strips, and component leads. Spring-loaded stroke and convenient size increase efficiency and speed production. The main body of the tool is constructed of sturdy, light-weight aluminum for long life. Load or unload with one hand. Overall length 6 15/16″. Replaceable low resistance Teflon tip.

ST-1163	"Precista" Vacuum Desolder Pump
ST-1164	Replacement tip

Solder Remover

C Small, light-weight, easy to use for solder removal on circuit boards, etc. Teflon tips easily changed or replaced.

ST-725	1 oz.
ST-726	2 oz.
ST-727	13/16″ Replacement teflon tip
ST-728	1 1/4″ Replacement teflon tip

Desoldering Irons Speed Printed Circuit Board Servicing

D Versatile tool makes it a breeze to remove solder from the smallest, hardest to get at places when you need to replace transistors, diodes, resistors, condensers and other components . . . even simplify removing difficult pin or button type sockets with center posts. The irons heat and remove solder by vacuum action and can be used to resolder too, all in one operation. Streamline design enables you to see the work at all times even in the smallest work areas, thus reducing costly, time-consuming errors.

ST-1147	Endesco 510-3 20/40W desoldering soldering iron with switch and 3-wire cord.

Replaceable Desoldering/Resoldering Tips

MODEL	TIP I.D.	THREAD	TIP O.D.
ST-443*	1/16″	female	1/8″
ST-624	3/64″	male	3/32″
ST-625	1/32″	male	5/64″

*For discontinued ST-440

IC Extractors

E Dual in-line and TO-5 IC extractors provide fast release and prevents board damage. Unique spring loaded action locks on instantly and automatically releases IC when heat is applied.

ST-909	Dual in-line IC extractor "Ungar" #6982
ST-910	TO-5 IC extractor "Ungar" #6983

Pen Brush Eraser

F Adjustable erasers for printed circuit and chassis maintenance. Units come in a miniature cylindrical container with a jacket clip. These units provide fine grade abrasive action that will clean any dirt or corrosion. ST-890 has stainless steel bristles and is ideally suited for large metallic areas where no danger of electrical shorts exist. ST-888 has fiber bristles and is designed for printed circuit applications.

ST-890	Eraser with stainless steel bristles
ST-888	Eraser with fiber bristles
ST-891	Stainless steel refill for ST-890
ST-889	Fiber refill for ST-888

Solder

G Solder features super-active resin flux that cleans more thoroughly without being corrosive. Can be used for a wide range of metals, including zinc and nickel-plate. Ideal for printed circuit work.

ST-152	1 lb. Spool 1/16″ DIA. 60/40
ST-633	1 lb. Spool .031 DIA. 60/40

Special Solder

Provides component protection against flux damage while maintaining firm connections under normal high heat conditions.

PK-773	10 ft. of 10-10041A18; 95% Tin—5% Antimony Solid Core
10-400889	10% Tin—90% Lead Rosin Core
10-122311	95% Tin—5% Antimony Rosin Core

Silver Solder

PK-771	12 ft. of 10-10041A61; Alloy content: 1.4% Ag, 36.1% Pb, 62.5% Sn

Multi-Purpose Seizer

H Curved nose, extra-tight lock makes this stainless steel tool ideal for retrieving items in awkward places. Outreaches and out-holds needle-nose pliers in applications such as holding wires for soldering or repairing. An excellent transistor heat sink.

ST-207	Multi-Purpose Seizer

Straight Forceps Seizer

I Similar to ST-207 curved nose seizer but less bulky. Unit is only 4 inches long. Specifically recommended for servicing miniature circuit boards.

66-83117C01	Straight Forceps Seizer

Installation Tools, Paints, Lubricants and Compounds

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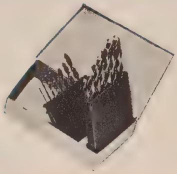
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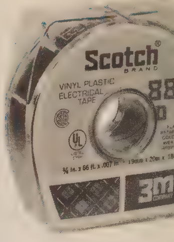
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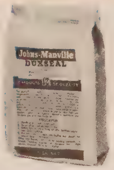
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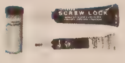
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Ace Tap and Die Set

A A complete set of taps and dies, plus all essential accessories. Precision-made set consists of one each tap and die: 4-36, 6-32, 8-32, 10-32, 10-24, and 12-24. (Machine Screw Standard); ¼-20, 5⁄16-18, ⅜-16, 7⁄16-14, and ½-13 NC (U.S. Standard); ¼-28, 5⁄16-24, ⅜-24, 7⁄26-20, and ½-20 NF (S.A.E. Standard); ⅛″ pipe. Also includes die stock, tap and reamer wrench. "T" tap wrench, screwdriver, and pitch gauge. All parts of this precisely crafted set are made of high tempered carbon steel. Wt. 4 lbs.

ST-661	Tap and die set

Nibbling Tool

B Cuts distortion-free holes in formed sheet metal up to 18 ga. steel or 16 ga. aluminum.

ST-138	Nibbling Tool
ST-162	Replacement Punches

Mechanics Drill Set

C Includes 15 quality, high speed drills from 1⁄16 through ½ inch, in graduations of sixteenths. Steel case has hinged cover; leaves hold drills in slots clearly marked as to size.

ST-144	Mechanics Drill Set

Cold Weather Electrical Plastic Tape with Dispenser

D A super-tough flame retardent black plastic backing provides excellent resistance to abrasions, oil, acids, etc. Extra pliability and conformability at temperatures down to 0°F. The tape is ¾″ wide and 66 feet long. The thickness is .0085″.

ST-453	Plastic cold weather electrical tape with dispenser

Duxseal

E All-purpose, weatherproof, corrosion resistant sealing compound for indoor-outdoor caulking of conduit runs, antenna lead-ins, journal boxes and dozens of other sealing applications.

ST-193	"DUXSEAL"—1 lb. Pkg.

Touch-Up Sticks

F Handy touch-up sticks for your tool box.

11-84454E01	Shadow White for "Micor" Indoor Cabinet
11-84454E02	Shadow Bronze for "Micor" Indoor Cabinet
11-84454E03	Shadow Tan for "Micor" Outdoor Weatherproof Cabinet
11-84454E04	Haze Beige for consoles

Lubricants, Compounds

G Miscellaneous lubricants and compounds and other chemicals.

11-114110	Iron core and tuning slug lubricant powder.
11-834678	¼ oz. tube Silicone Grease. For type N and UHF fittings. Apply grease to fittings before joining to fill voids so that no moisture can collect. Prevent drop in efficiency of electrical insulation and resulting transmission losses.
11-490487	Same as above except 8 oz. tube.
11-842335	Pliobond #20 Cement. Rapid drying adhesive for bonding rubber, metal, glass, plastics, fabrics. ⅜-oz. tube.
ST-672	Silastic clear sealer, 2 oz. tube, dries clear.
11-82419D01	Rubber to metal Cement 2 oz.
11-84306A55	LocTite Screw Lock makes any screw a lockscrew. Prevents vibration loosening.
11-10019A88	DOW 3141 RTV silicone rubber coating.
11-10019A53	GE RTV112 white adhesive sealant.
11-83166A01	WAKEFIELD Thermal compound for heat sinking power transistors.

LEAK TEC Foam

H A scientifically developed neutral fluid for detecting high or low pressure leaks quickly, with absolute safety. When applied to a suspected leak area, the fluid reacts immediately to even the most minute leak by forming a white bubble foam at the leak source.

11-82326A01	Leak Tec

Conductive Wrist Strap

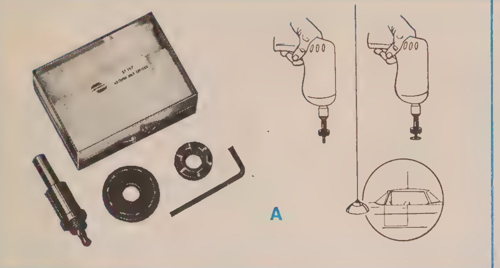
Helps keep operators, who are handling MOS and CMOS devices, at ground potential. This prevents damage to the devices, which are inherently fragile in their susceptibility to static electricity.

ST-1191	Conductive Wrist Strap

VELOSTAT Electrically Conductive Plastic Bags

Used for packaging MOS devices to reduce damage due to static charges.

56-83350K03	Conductive bag
56-83350K01	Conductive bag
56-83350K07	Conductive bag



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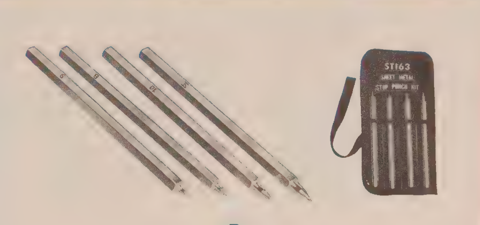

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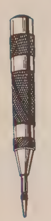

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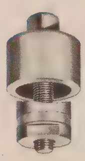

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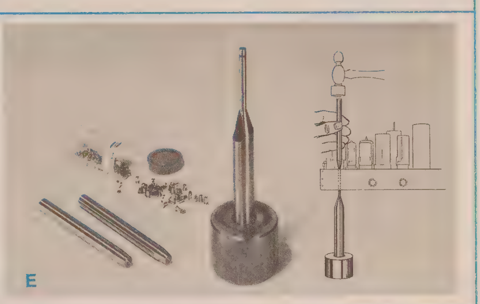

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Antenna Hole Cutting Tool

A Speed up antenna installations with this time-saving, easy-to-use tool. The antenna hole cutting tool is screwed on a sleeve around a ¼″ drill bit. Once the ¼″ pilot hole is made, the hole cutting tool takes over to carve out a clean antenna hole. The tool bites only through the thickness of the metal being drilled. It can go no further, thus there is no danger of drilling through headliner fabric or material. While the hole is being cut, the tool also removes a fine line of paint from the metal around the circumference of the hole to provide a good ground for antenna installation. This tool is designed for use with hand drills or ⅜″ or larger low-speed power drills. High cutting speeds will burn and dull the cutting edges. Cutting edges may be resharpened when necessary. Kit includes mandrel with ¼″ drill bit, Allen wrench, ¾″ hole cutter for high-band antenna installations and 1⁵⁄₁₆″ hole cutter for low-band antenna installations.

ST-157	Antenna Hole Cutting Tool
ST-158	1-5/16″ Replacement Cutter
ST-159	¾″ Replacement Cutter
ST-160	Cutter Shank
ST-161	Drill, Pilot

Sheet Metal Stop Punch Kit

B Ideal for "under-the-hood" work — making sheet metal screw holes for mounting fuse blocks, "A" relays or cable clamps. One of the unique features of these high quality metal stop punches is the precision measure of the punch taper length. The tool will accurately pierce metal to the exact size desired for number 6, 8, 10 or 14 sheet metal screws. The punch extrudes the metal thus providing a firm base for threads of sheet metal screws.

ST-163	Sheet Metal Shop Punch Kit
ST-164	Punch #6
ST-165	Punch #8
ST-166	Punch #10
ST-168	Punch #14

Automatic Center Punch

C The user has only to place the tip of the unit on the spot to be marked, apply pressure and a spring-action cam causes the punch to trip and leave a tiny punch mark.

ST-132	Automatic Center Punch
ST-410	Replacement Tip

Greenlee Chassis Punches

D Speed cutting of clean, accurate holes in chassis, cabinets, and panels for sockets, plugs, controls, lights. Excellent for enlarging knockouts. Cuts up to 16-ga. metal.

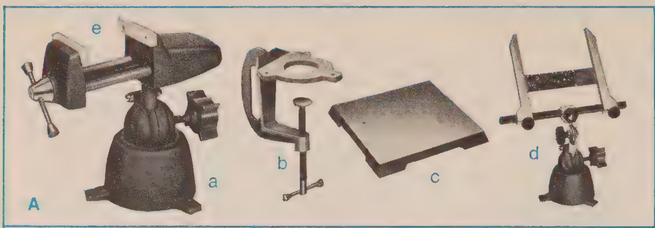
PART NO.	FINISHED HOLE SIZE	PART NO.	FINISHED HOLE SIZE
ST-300	⅝″	ST-305	1⅛″
ST-301	¾″	ST-306	1⁵⁄₃₂″
ST-302	¹³⁄₁₆″	ST-307	1¼″
ST-488	⅞″	ST-486	1⅜″
ST-303	1″	ST-489	1⁵⁄₁₆″
ST-304	1¹⁄₁₆″		

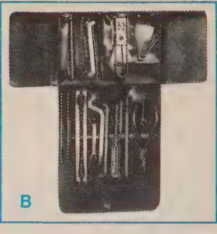
Anvil and Riveting Tool

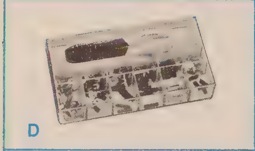
E Here's a handy tool that can be used for any item that must be rivet fastened. Position tube and crystal sockets . . . secure terminal boards to chassis . . . use it wherever a long lasting, secure rivet fastening is required. Complete kit includes anvil, sturdy metal base, 1 each size .088 and .122 riveting tools and tube of commonly used rivets.

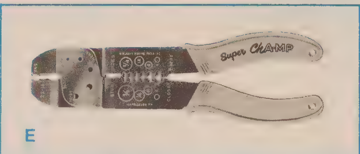
ST-172	Anvil and Riveting Tool Kit
ST-169	Anvil and Base
ST-170	.088 tool
ST-171	.122 tool
PDK-51	Tube of assorted rivets

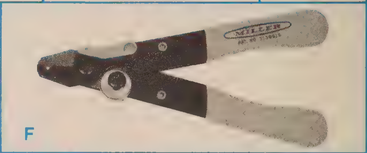
Hand Tools

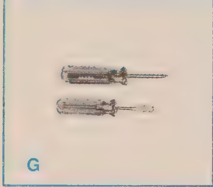


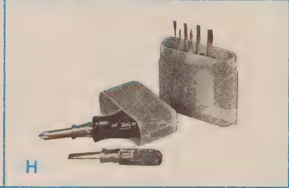


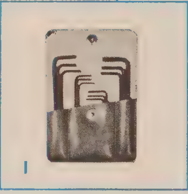


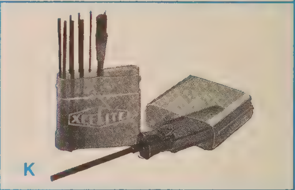












Multi-Purpose Service Vise

A Idealy suited as a work holder and positioner for filing, soldering, drilling and dozens of other operations conducted in the shop. Recommended as a holding jig for servicing "PT" series "Handie-Talkie" radios. Vise rotates 360° and tilts up and down to provide the proper angle for more simplified servicing.

ST-455	Service Vise & Base (a) & (e)
ST-456	Clamp Type Base (b)
ST-457	Cast Metal Base Plate (c)
ST-458	Circuit Board Holder only (d)
ST-609	Base Assembly only (a)
ST-610	Vise only (e)
ST-460	Metal Jaws (not shown)
ST-459	Nylon Jaws

Relay Maintenance Tool Kit

B This kit includes all the tools required for adjusting, checking and troubleshooting almost any type of relay.

For added convenience, all of the 18 tools in the kit are packaged in a sturdy Vinyl Plastic case which holds each tool in its own pocket, ready when you want it.

ST-104 Relay maintenance tool kit

Burnishing Tool

C Ideally suited for fine contact and point cleaning.

ST-563	Burnishing Tool
ST-564	Burnishing Blades

12 Pac Insulated Lug Assortment

D PDK-293 contains 12 of the most commonly used terminal lugs for radio servicing. Its selection of spade, tongue and wire splice lugs meet all standard wire sizes. "Super champ" crimper is also included for simplified bolt and wire cutting and stripping.

PDK-293	Insulated Lug Assortment
PDK-294	Insulated Lug Assortment less Crimping Tool

SUPER CHAMP Crimper

E Crimps terminals and strips wire from 22 to 10 gage, shears screws, and bolts up to 3⁄16" diameter—plastic sleeves on handles are shock and slip proof.

ST-120 Super Champ*

Wire Strippers

F Adjustable for all sizes from 10 gauge.

ST-562 Wire Stripper

Screwdrivers

G Phillips Screwdrivers

PART NO.	POINT SIZE	BLADE LGTH.
ST-234	‡0	2½"
ST-233	*1	2⅛" x 3⁄16"
ST-232	*2	2½" x ¼"

*Combination Phillips and conventional screwdrivers with reversible blade.

‡Ideally suited for removing screws from Pocket Receiver case.

H Miniature Screwdriver Set

Midget size—fits in pocket. Contains 5 blade tip screwdrivers: (3/32", ⅛", 5/32", 3/16", ¼") 3 Phillips screwdrivers (#0, #1, #2). Each screwdriver has integral handle with large hollow handle for extra torque.

ST-498 Screwdriver Set and Case

Hex and Spline Key Wrench Kit

I A complete wrench kit for both hex and spline type screws, used in the electronic field. Twelve wrenches enclosed in an attractive leatherette case. Will fit #2 to ⅜" screws.

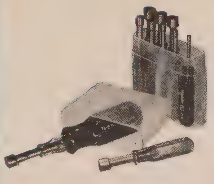
ST-260 Hex & Spline Wrench Set

Wire Staple Gun

J Install wire and cable or other round objects up to ¼" in diameter quickly with

*"Super Champ" and API are trademarks of Aircraft Marine Products, Inc.

J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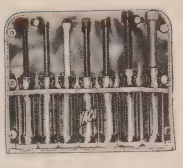
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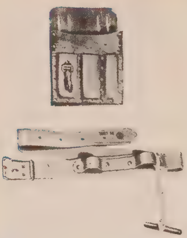
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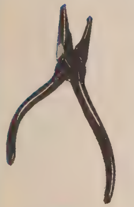
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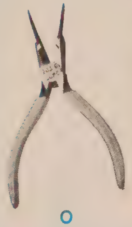
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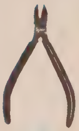
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T

this tapered head staple gun. It gets into tight corners easily and its round crown staples provide a snug fit.

ST-466	Staple Gun
ST-467	Staples 3/8″
ST-468	Staples 5/16″

Driver Sets

K Allen Wrench Driver Set

This set of interchangeable Allen blades is conveniently packaged in a handy plastic storage case and includes 9 different blades, a 4″ extension and a plastic driver handle. Sizes included range from a tiny .050″ to 3/16″.

ST-613 Allen Wrench Driver Set

L Nut Driver Set

Graded in steps of 32nds of an inch, these drivers speed servicing of miniature equipment. The ten nut drivers are color coded and packed in a plastic case. Extra "slipover" handle provides more grip, reach and turning power.

ST-454 Nut Driver Set

M Nut Drive Sets

7 Hex sizes 3/16″ to ½″ with hollow color coded shafts for quick identification.

ST-150	In wrap around plastic holder
ST-151	In bench stand holder

Assorted Pliers

Flush Cutting Pliers

N Extremely handy in working with printed circuits or when wires or leads must be cut flush with the work. Flush-cutting pliers facilitate cutting leads in compact equipment. Tool is 4¾″ long with spring open jaws.

ST-206 Flush Cutting Pliers

Needle Nose Pliers

O Precision made for close tolerance work. Sure-grip tips provide firm holding of the most minute components. Plastic cushion grips make handling easy. 6⅝″ long.

ST-202 Needle Nose Pliers

Long Nose Pliers

P Full polished needle-point 6″ pliers with cutter. Professional type for electronic servicing. Has milled jaws, tapers to 1/32″ needle points.

ST-203 Long Nose Pliers

Curved Long Nose Pliers

Q Ideally suited for holding components in the correct positions when soldering or wiring . . . Eliminates awkward hand placements. Angle gives full clearance. Size: 6-in.

ST-208 Curved Long Nose Pliers

Long Nose Pliers

R Unit is 4¾ inches long. Ideal for reaching into small recesses. Coil spring holds pliers open when not in use.

ST-201 Long Nose Pliers

Oblique Cutting Pliers

S This 4 3/16 inch unit has plated coil springs to hold jaws in open position when not in use. Handles are plastic coated to provide a firm, insulated grip.

ST-200 Oblique Cutting Pliers

Needle Point Diagonal Cutting Pliers

T Professional pliers with full polished finish. Nose of diagonals is beveled at a 60° angle to give the cutters their fine 1/32″ needle points. 6″ long.

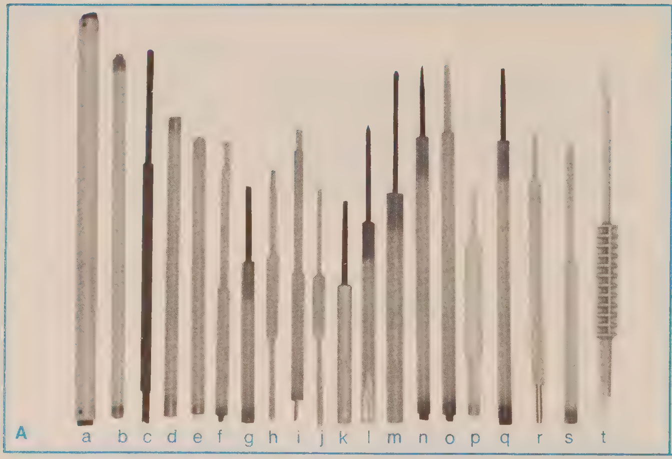
ST-204 Needle Point Diagonal Cutting Pliers

Combination Tool Pouch and Belt

U Ideal for installation work. High quality leather for long life. Extra-large gusseted utility pocket, 3 plier pockets, 2 screwdriver pockets, knife snap. Size, 7x10″.

ST-113	Tool Pouch
ST-803	32 to 40″ Belt
ST-804	38 to 46″ Belt

Tuning Tools



MOTOROLA
SERVICE
B

Tuning Tools

A See Personal Portable Service Aids Section for additional Tuning Tools.

(a)	**66-84645**	For ¼ KW final amplifiers. Has metal blade ends; length: 8¼″.
(b)	**66-810479**	Has recessed metal slot on one end; other end has ⅛″ metal screwdriver tip; length, 7¼″.
(c)	**66-835717**	One end has hex body with screwdriver tip; other end has plain hex tip; length, 7½″.
(d)	**66-891488**	One end has recessed metal screwdriver. Other end has metal recessed slot; length, 6″.
(e)	**66-891487**	One end has metal screwdriver blade; other end has recessed metal screwdriver blade; length, 5⅝″.
(f)	**66-859078**	One end has hex tip; other end has screwdriver metal blade; length, 5⅝″.
(g)	**66-863627**	One end has special screwdriver tip; other end has recess metal slot; length, 4¾″.
(h)	**66-824842**	Both ends have 7/64″ hex tips; length, 5″.
(i)	**66-83398A01**	One end has metal screwdriver blade; other end has 7/64″ hex tip; length, 5⅞″.
(j)	**66-83395A01**	Both ends have 5/64″ hex tips; length, 4¾″.
(k)	**66-825015**	Has special 3/32″ square end; length, 4½″.
(l)	**66-83034A01**	One end has ¼″ screwdriver blade; other end has 1/16″ screwdriver blade; length, 6″.
(m)	**66-83033A01**	One end has ⅛″ hex tip with screwdriver blade extended from hex tip; other end has ¼″ recessed head; length, 7″.
(n)	**66-82824C01**	One end has 3/16″ special metal screwdriver blade; other end has pointed 3/32″ special screwdriver blade; length, 7″.
(o)	**66-82825C01**	One end has metal screwdriver blade; other end has 7/64″ hex tip; length, 7″.
(p)	**66-83254C01**	Has recessed metal slot on one end; other end has 3/32″ wide screwdriver blade. Length, 4¾″.
(q)	**66-82824C04**	One end has ¼″ metal screwdriver blade; other end has 3/32″ special pointed screwdriver blade; length, 7⅛″.
(r)	**66-834682**	One end has ⅛″ screwdriver blade; other end has metal recessed oval opening; length; 5¾″.
(s)	**66-835721**	One end has 3/16″ screwdriver blade; other end has metal recessed slot; length, 5½″.
(t)	**66-82977K01**	One end has a double hex 5/64″ and 7/64″ and a 1/16″ wide screw driver tip; other end has special ⅛″ wide metal blade with "V" groove. Length 7¼″. For "Maxar" radio. Also replaces 66-83255C01, 66-83256C01, and "Micor"/"Triton" 66-83256C02.

MICOR Radio Tuning Tool Kit

Contains three tools for servicing "Micor" radios. Consists of tuning tool 66-82977K01 (Fig. t above), contact removal tool 66-84690C01, and cable routing tool 66-84953C01.

TLN-4301A Tuning Tool Kit

MOTRAC/MOTRAN Radio Tuning Tool Kit

Contains 2 tools for servicing MOTRAC and MOTRAN series radios. Kit consists of figures p and t.

TLN-6845A Tuning Tool Kit

BUSINESS DISPATCHER Tuning Tool Kit

Contains 3 tools for servicing models D31 & D33BMT, CMT series of the "Business Dispatcher" radios. Consists of figures n, o, and r.

TLN-6658A Tuning Tool Kit

Monitor Receiver Tuning Tool Kit

Contains 3 tools for servicing LO1 & LO3 monitor receiver series. Consists of figures h, k, and r.

TLN-6067A Tuning Tool Kit

Standard Mobile Tuning Tool Kit

Kit consists of figures c, g, and r.

TK-578 Tuning Tool Kit

Tuning Tool Kit

B Here's an assortment of five of the most commonly used tuning tools to meet most servicemen's routine needs. The tools are offered in a convenient pocket-carrier kit with pencil-type clips with each tool.

PDK-6612 assortment includes: (s) 66-835721, (f) 66-859078, (g) 66-863627, (e) 66-891487, and (r) 66-847036.

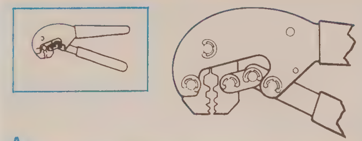
PDK-6612	Tuning Tool Kit
42-82749D01	Pencil-type clips 10/pk

The Parts Department
of the Motorola Communications Group

Warehousing

Over 30,000 different parts are immediately available. The central stockroom in Lombard, Illinois is as large as two football fields.

Bulk Items Lower Prices for Bulk Purchases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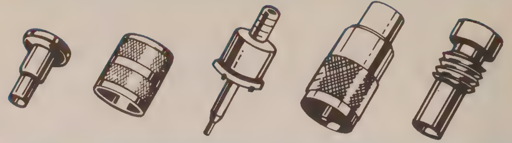
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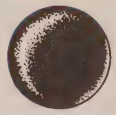
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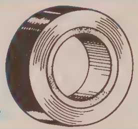
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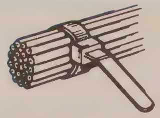
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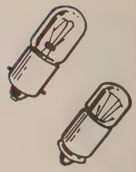
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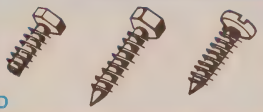
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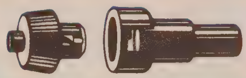
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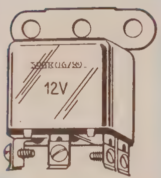

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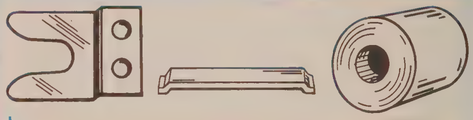


J

Important! Order items by special number designating quantity of packages desired, not individual units. Example: If you wish to order 200, 38-83042H74 hole plugs, submit your order as 2 packs RBP38-83042H74.

Crimping Tools

A Crimping tool for RG8/U, RG58/U or RG59/U "crimp-on" connectors. One per package.

RSX-4024A	Crimping Tool. (Replaces RSX-4000A)

Connectors/Reducers

B 100/pk except where noted

RBP28-42310	Connector. PL259 for RG58A and RG8A/U.
RBP28-80324A75	Connector. Crimp-on type CP-L259-1 for RG58-59/U.
RBP28-80324A76	Connector. Crimp-on type CP-L259-12 for RG8/U.
RBP58-854020	Reducer. UG175/U for RG58A/U.
RBP58-848363	Reducer. UG176/U for RG58/U. 25/pk.
RBP28-82021G01	PL-259 plug, teflon insulation. Suggested use all frequencies up to 1GHz.
RBP28-80325A29	PL-259 plug, same as 28-82021G01 except with silver barrel which allows easy soldering of the braid.

Antenna Hole Plugs

C 100 per package

RBP38-83042H73	Antenna Hole Plug. ⅜″ x 1¼″.
RBP5-803001	Antenna Hole Plug. ¾″ x 1½″.
RBP38-83042H74	Antenna Hole Plug. ⅞″ x 1½″.

Common Mtg. Screws

D 1000 per package

RBP3-7467	PLN Hex Head Screws #8-18 x ⅜″.
RBP3-122830	Slt. Pan Head Screws #8-15 x ½″.
RBP3-125947	L Hex Head Screws #14-10 x ¾″.
RBP3-129278	L Hex Head Screws #14-10 x 1″.
RBP3-132277	L Hex Head Screws #14-10 x 1½″.

Misc. Electrical

E	**RBP1-82779C01**	3AG Fuse Holder. 100/pk.
F	**RBP11-80324A59**	Plastic Electrical Tape, ¾″ x 66′. 100/pk.
G	**RBP59-813674**	Horn Relays. 25/pk.

Cable Ties

H These self-adjusting, self-locking ties provide a permanent neat harness and can be applied either by hand or tool. The one-piece molded units are made of the finest virgin nylon and combine outstanding physical properties such as light weight, abrasion resistance, high tensile strength, exceptional dielectric properties with chemical resistance to common solvents, alkalies, dilute acids, oils and grease. To install, simply tighten to desired tension and cut off excess strap. Shipped 1000 per package.

42-80313A70	Cable tie. Overall length, 3¾″. Max. bundle dia. ⅝″.
42-80313A71	Cable tie. Overall length, 8⅛″. Max. bundle dia. 2″.

Drill Bits

I 24 per package

RBP66-80324A56	⅛″ Size Drill Bits.
RBP66-80324A57	9/64″ Size Drill Bits.
RBP66-80324A58	13/64″ Size Drill Bits.

Installation and Service Parts

J A number of miscellaneous installations and service parts are also available in bulk packages.

RBP64-85596	Microphone hang-up clip. 50/pk.
RBP14-5197A01	Code lens cap for "Pageboy II" Pager. 50/pk.
RBP43-863035	1″ spacer bushing for mobile trunk mount installation. 100/pk.

Console Bulbs

K 100 per package

RBP65-83358H06	Type #327 Console Bulb.
RBP65-84991B01	Type #388 Console Bulb.
RBP65-82010C16	Type #757 Console Bulb.
RBP65-810161	Type #1829 Console Bulb.

Terminals and Splices

Ring and spade terminals and splices are available in packages of 100. One-piece design, tin-plated copper terminals and splices have wire range clearly stamped on back for quick identification.

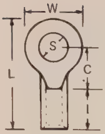


Figure A

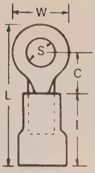


Figure B

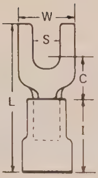


Figure C

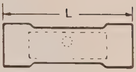


Figure D

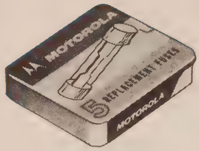
Part No.	Figure	Description	Insulation Color	Stud Size -S-	Width -W-	Length -L-	Clearance -C-	-I-	Stock Thickness	Wire Insulation	Wire Size
							Min.			Diameter Max.	
Non-Insulated											
29-80315A59	A	Ring	—	5/16″	15/32″	57/64″	13/32″	1/4″ Min.	.032″	—	22-18 Ga.
29-80315A60	A	Ring	—	10 Ga.	5/16″	45/64″	9/32″	1/4″ Min.	.032″	—	16-14 Ga.
29-80315A61	A	Ring	—	10 Ga.	3/8″	3/4″	5/16″	1/4″ Min.	0.40″	—	12-10 Ga.
29-80315A62	A	Ring	—	1/4″	17/32″	59/64″	13/32″	1/4″ Min.	.040″	—	12-10 Ga.
29-80315A63	A	Ring	—	5/16″	17/32″	59/64″	13/32″	1/4″ Min.	.040″	—	12-10 Ga.
29-80315A64	A	Ring	—	3/8″	19/32″	1-1/32″	31/64″	1/4″ Min.	.040″	—	12-10 Ga.
29-80315A65	A	Ring	—	1/4″	15/32″	61/64″	11/32″	5/16″ Max.	.050″	—	8 Ga.
29-80315A66	A	Ring	—	5/16″	15/32″	61/64″	11/32″	5/16″ Max.	.050″	—	8 Ga.
29-80315A67	A	Ring	—	3/8″	19/32″	1-5/64″	13/32″	5/16″ Max.	.050″	—	8 Ga.
Insulated											
29-80315A50	B	Ring	Red	10 Ga.	5/16″	53/64″	5/16″	23/64″ Max.	.032″	.145″	22-18 Ga.
29-80315A53	B	Ring	Blue	10 Ga.	11/32″	27/32″	5/16″	23/64″ Max.	.032″	.175″	16-14 Ga.
29-80315A56	B	Ring	Yellow	10 Ga.	3/8″	1-1/16″	5/16″	9/16″ Max.	.040″	.255″	12-10 Ga.
29-80315A57	B	Ring	Yellow	5/16″	17/32″	1-15/64″	11/32″	9/16″ Max.	.040″	.215″	12-10 Ga.
29-80315A51	C	Spade	Red	5-6 Ga.	19/64″	47/64″	7/32″	23/64″ Max.	.032″	.145″	22-18 Ga.
29-80315A54	C	Spade	Blue	10 Ga.	3/8″	53/64″	1/4″	23/64″ Max.	.032″	.175″	16-14 Ga.
43-80315A52	D	Splice	Red	—	—	15/16″	—	—	—	.145″	22-18 Ga.
43-80315A55	D	Splice	Blue	—	—	15/16″	—	—	—	.200″	16-14 Ga.
43-80315A58	D	Splice	Yellow	—	—	1-1/16″	—	—	—	.255″	22-18 Ga.

CROSS REFERENCE

BULK PROGRAM ITEMS VS. SIMILAR ITEMS

New Bulk Item		Similar Existing Item		New Bulk Item		Similar Existing Item	
Part Number	Packaging	Part Number	Packaging	Part Number	Packaging	Part Number	Packaging
29-80315A59	100/pk	29-834053	10/tu	RPX-4502A	25/pk	58-848363	5/pk
29-80315A60	100/pk	29-832115	10/tu	RPX-4503A	100/pk	28-80324A75	Each
29-80315A61	100/pk	29-824154	10/tu	RPX-4504A	100/pk	28-80324A76	Each
29-80315A62	100/pk	29-824152	10/tu	RPX-4505A	100/pk	38-83042H73	Each
29-80315A63	100/pk	29-830073	10/tu	RPX-4506A	100/pk	5-803001	5/pk
29-80315A64	100/pk	29-832116	10/tu	RPX-4507A	100/pk	38-83042H74	Each
29-80315A65	100/pk	29-868311	5/tu	RPX-4508A	1000/pk	3-7467	30/pk
29-80315A66	100/pk	29-824454	5/tu	RPX-4509A	1000/pk	3-122830	20/pk
29-80315A67	100/pk	29-847817	5/tu	RPX-4510A	1000/pk	3-125947	20/pk
29-80315A50	100/pk	29-867965	20/tu	RPX-4511A	1000/pk	2-129278	10/pk
29-80315A53	100/pk	29-867966	20/tu	RPX-4512A	1000/pk	3-132277	10/pk
29-80315A56	100/pk	29-867967	10/tu	RPX-4513A	1000/pk	1-82779C01	Each
29-80315A57	100/pk	29-867968	10/tu	RPX-4514A	100/pk	11-80324A59	Each
29-80315A51	100/pk	29-868310	20/tu	RPX-4515A	25/pk	59-813674	Each
29-80315A54	100/pk	29-867964	20/tu	RPX-4516A	24/pk	66-80324A56	Each
43-80315A52	100/pk	43-867962	20/tu	RPX-4517A	1000/pk	66-80324A57	Each
43-80315A55	100/pk	43-867963	20/tu	RPX-4518A	24/pk	66-80324A58	Each
43-80315A58	100/pk	43-857515	20/tu	RPX-4519A	50/pk	64-85596	Each
42-80313A70	1000/pk	42-84066A60	10/pk	RPX-4520A	100/pk	65-83358H06	Each
42-80313A71	1000/pk	42-84066A61	10/pk	RPX-4521A	100/pk	65-84991B01	Each
RPX-4500A	100/pk	28-42310	2/pk	RPX-4522A	100/pk	65-82010C16	Each
RPX-4501A	100/pk	58-854020	5/pk	RPX-4523A	100/pk	65-810161	10/pk

Fuses



FUSES
MOTOROLA

A

B

3AG (MDL) Type SLO-BLO Fuses

PART NO.	AMPS	VOLTS
65-879842	1/32	250
65-841650	⅛	125
65-817952	.15	125
65-892098	3/16	125
65-802992‡	¼	125
65-817954	3/10	125
65-834465‡	4/10	125
65-475395*‡	½	125
65-817953	6/10	125
65-892099*‡	¾	125
65-804910*‡	1	125
65-834466‡	1¼	125
65-804909	1.6	125
65-804908*‡	2	125
65-817955*	3	125
65-834464	4	125
65-817956*‡	5	125
65-475247*‡	6¼	125
65-475248	8	32
65-834619*‡	10	32
65-804906‡	15	32
65-850521‡	20	32
65-84307A56	25	32
65-84307A57	30	32

3AG (AGC) Type Quick to Medium Acting Fuses

PART NO.	AMPS	VOLTS
65-61668	1/16	250
65-474899	⅛	250
65-20987‡	¼	250
65-868957	⅜	250
65-21975‡	½	250
65-865519	3/10	250
65-898635	¾	250
65-52281‡	1	250
65-890033‡	1½	250
65-42092*‡	2	250
65-129421	2½	250
65-20404‡	3	250
65-61688	4	250
65-52293	5	250
65-51029*‡	5	32
65-15270‡	6	250
65-86099‡	7½	32
65-10266*‡	10	32
65-4165*‡	15	32
65-4637*‡	20	32
65-61682*‡	25	32
65-20986*‡	30	32

4AG (AGS) Type Quick to Medium Acting Fuses

PART NO.	AMPS	VOLTS
65-81441‡	5	32
65-84433‡	15	32
65-109030	20	32
65-41492‡	30	32

8AG (AGX) Type Fast Acting Instrument Fuses

PART NO.	AMPS	VOLTS
65-42869	1/200	
65-61676	1/32	250
65-61677	1/16	250
65-61678	⅛	250
65-34860	¼	250
65-40217	½	250
65-131165	¾	250
65-61681	1	250
65-61679	2	125
65-138180	5	125

1AG Medium Acting Automotive Type ¼″ Dia. by ⅝″ Long

PART NO.	AMPS	VOLTS
65-122345	5	32
65-82496G01	3	32
65-82496G02	2	32
65-82496G03	10	32

5 AG (AGU & KAA) Fast Acting 13/32″ Dia. x 1½″ Long

PART NO.	TYPE	AMPS	VOLTS	
65-136969	AGU 15	15	32	Micor
65-138794	AGU 25	25	32	
65-61683	AGU 40	40	32	
65-61684	AGU 50	50	32	Motran
65-138164	AGU 60	60	32	
65-84699C01	KAA 15	15	130	Comm. Console

4AG (MDM) Type SLO-BLO Fuses

PART NO.	AMPS	VOLTS
65-880865	1	250
65-880866	2	250
65-800751	3.2	32
65-800752	4	32
65-800753	5	32
65-801233	6¼	32
65-800754	8	32

Wall Mount Fuse Assortment

A Motorola-recommended assortment contains 30 boxes of the fuses most commonly used in Motorola 2-way radio equipment. Sturdy plastic holder is designed for wall-mounting. Card at rear of transparent holder is imprinted with identification of fuse by amperage, voltage and Motorola part number. Holder actually has provisions for holding 60 boxes of fuses, giving the user the opportunity to supplement the Motorola-recommended assortment with other fuses indicated on the identification card.

PDK-652	Motorola-Recommended Assortment with Fuse Rack
ST-134	Plastic Fuse Rack Only

Handie-Pac Fuse Assortment

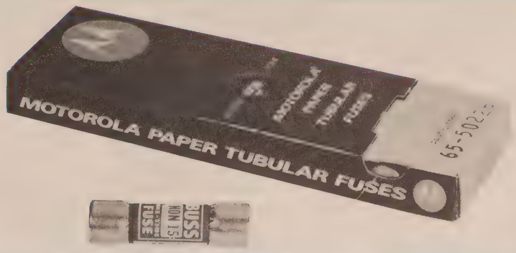
B Ideal for use away from the shop . . . fits in the tool box or stores readily in the service vehicle. Fuses are easily identified through transparent plastic top. Standard assortment consists of 15 assorted boxes of the fuses commonly used in 2-way radio servicing. Assortment includes fuses set off by asterisks (*) in listing above.

PDK-651	Standard Fuse Assortment
ST-417	Plastic Fuse Box Only

*Indicates fuses included in assortment PDK-651.

‡Indicates fuses included in assortment PDK-652.

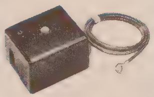
A



B

BUSS
FUSE
BUSS
FUSE

C



D

E

Clip-on Fuse Kit

A DON'T REWIRE . . . just because part of the in-line fuse has deteriorated, and you haven't enough slack. The PDK-1116 provides you with a quick, easy method of replacing in-line fuse holders. The fuse bodies and caps have 9″ leads with crimp splices on the leads. Straps are included for tieing back hanging slack. Just remove the faulty part, strip off 1/4″ of insulation, and crimp on the new assembly.

PDK-1116 Clip-On Fuse Kit consists of:

Part Number	Quantity	Description
1-84066A68	5	Heavy Fuse Body and Lead
1-84066A69	5	Heavy Fuse Cap and Lead
1-84066A70	5	Light Fuse Body and Lead
1-84066A71	5	Light Fuse Cap and Lead
42-84066A60	6	Panduit Straps

Paper Tubular Fuses

B Handy dispenser contains ten fuses of the same type with part number prominently stamped on box.

PART NO.		AMPS
65-810140		6
65-80185		10
65-50226		15
65-52482		20
65-834356		25
65-50671		30
65-84434		35
65-83578C01	(2″ x 9/16″)	35
65-830314		40
65-84161B01	(1.12 x .40 dia., Special for Micor radio)	40
65-83578C02	(2″ x 9/16″)	45
65-83860		50
65-891578*		60

*Not included in dispenser assortment.

Special Dual Element.
2″ x 9/16″ up to 30 amps.
3″ to 3/4″ over 3 amps.
**2″ x 9/16″

Household Fuses

C Plug fuse for use in fixed station Communication equipment over the temperature range of −30°C to +85°C.

MOTOROLA PART NO.	CURRENT RATING
65-83099A01	3
65-83099A05	6
65-83099A02	8
65-83099A03	15
65-83099A04	20

Fuse Block and "A" Relay Assemblies

D Assembly contains relay and fuse block supplied with the "A" cable attached.

1-859440	6 or 12V, large fuse clips, horn relay.
1-859445	12 volt, small fuse clips, horn relay.

Collar Fuse Adapter

E Adapts 1-30 amp fuses to 30-60 amp fuse holder. Useful in 12 volt conversions.

43-831204 (1 pair)

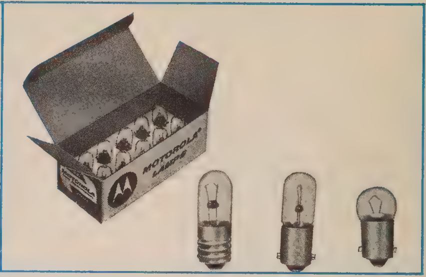
Special Fuses

	TYPE	AMPS	VOLTS	
65-136969	AGU 15	15	32V	Micor
65-84161B01	Special	40	32V	Micor
65-138164	AGU 60	60	32V	Motran
65-82896B01	Mini	100 ma	125V	HT
65-82896B03	Mini	1.0 Amp	125V	HT
65-82896B04	Mini	2.0 Amp	125V	HT
65-82291J01	Pigtail	1.0 Amp	250V	Handi Com
65-84206D07*	Mini	1/10 Amp	125V	S-1327 Serv Mon
65-84699C01	KAA 15	15 Amp	130V	Comm. Consoles
65-139554	6FK5	5 Amp	125V	MX300

*Replaces 65-84255C40 1/20 Amp Fuse

Lamps

ST-585
ST-691



Tower Bulbs

Towers and other high obstructions that are not lighted due to a bulb burnout are hazards to aircraft navigation. Keep a supply of spare bulbs in your shop and vehicles and help prevent accidents.

6000 Hr. and 3000 Hr., 620 Watt Bulbs

These MoGul Pre-focus lamps are used in beacon lighting systems for obstructions to navigation such as TV, radio, microwave and transmission line towers, bridges, water tanks stack and other tall structures as specified by the CAA and FCC.

65-866713	3000 hr., 620W-120V Mogul Pre-Focus
65-84258C75	6000 hr., 620W-130V Mogul Pre-Focus

6000 Hr. 116 Watt Bulb

This is a 6000 hr., 120V, 116 watt screw base lamp used in obstruction lighting and meets CAA and FCC tower lighting requirements.

65-84258C74	6000 hr., 116W-120V Screw Base

Console Replacement Bulb Pack

PART NUMBER	QTY.	TYPE	COLOR
PK-218	50	CM327	CLEAR
PK-219	100	CM327	CLEAR

Bulb Pullers

PART NO.	DESCRIPTION
ST-585	Bulb puller (for type 327 & 388 bulbs)
ST-691	Bulb puller (miniature type bulbs)

Miniature Lamps

Supplied in lots of 10 unless otherwise noted

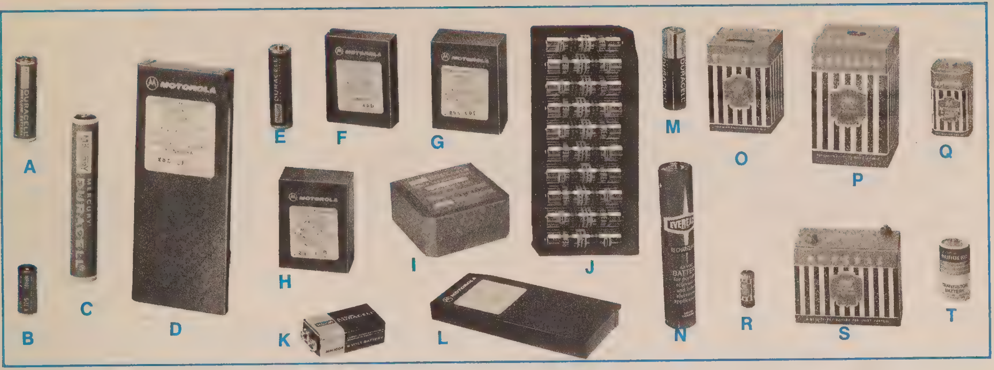
TYPE	VOLTS	AMPS	BULB & BASE	PART NUMBER
40	6-8	.15	TUB SCR	65-14549
43	2.5	.5	TUB BAY	65-810328
44	6-8	.25	TUB BAY	65-10867
45	3.2	.35	TUB BAY	65-831645
47	6-8	.15	TUB BAY	65-11854
48	2.0	.06	TUB SCR	65-35438
49	2.0	.06	TU BAY	65-82010C06
51	6-8	.20	RND BAY	65-4151
53	12-16	.10	RND BAY	65-857026
55	6-8	.40	RND BAY	65-12855
57X	12-16	.23	RND BAY	65-535060
63K	6-8	.73	CAND SCR	65-891831
73	14	.08		65-83376K01
81	6.8	1.02	RND BAY	65-127162‡
161	12	.19	"MICOR"	65-83554G01
313	28	.17	MIN. BAY	65-82010C13
313G	28	.17	TUB BAY	65-82010C05
313R	28	.17	TUB BAY	65-82010C10
313Y	28	.17	TUB BAY	65-82010C09
327	28	.04	MIDGET	65-83358H06‡
328	6	.20	MIDGET	65-861827‡
330	14	.80	MIDGET	65-861828‡
335	28	.04	TUB SCR	65-86556A01‡
338	2.7	.06	TUB CLIP	65-82671G01
344	10	.015	TUB CLIP	65-82671G02‡
356	28	.17	RND BAY	65-82010C01
388	28	.12	MIDGET	65-84991B01
455	6.5	.50	RND BAY (FLASHER)	65-82010C07
756	14	.080	TUB BAY	65-82010C03
757	28	.08	TUB BAY	65-82010C16‡
965	9.8	.5	SCR	65-848568
1445	18	.15	RND BAY	65-82010C02
1446	12	.20	MIN. SCR.	65-852595
1465	14	.08	SPECIAL	65-83573E01‡
1490	3.2	.16	TUB BAY	65-834423
1815	12-16	.20	TUB BAY	65-84419
1819	28	.040	TUB BAY	65-82010C04
1820	28	.1	TUB BAY	65-82010C11
1829	28	.07	TUB BAY	65-810161
1847	6-8	.15	TUB BAY	65-125595
1850	5	.09	TUB BAY	65-82010C08
1855	6.3	.180	RND BAY	65-854090
1866	6.3	.25	MIN. BAY	65-82010C14
1892	12	.04	TUB BAY	65-538410
CM-8-193	28	.04	TUB SCR	65-04261C02‡
GE6	6.4	.10	RND BAY	65-82010C12‡
GE161	14	.19	TUB CLIP	65-83554G01
NE76	120	.10	TUB PLUG	65-859383‡

‡Individually packaged

Neon Glow Lamps

PART NO.	TYPE	VOLTS	WATTS	BASE
65-898920	NE51	65	.04	S C BAY
65-818438	NE51H	110/125	.25	S C BAY
65-817617	NE2	65	1/25	Unbased
65-868606	NE2H	110-125	.25	Wire Term.

Batteries



Mercury

PART NO.	FIG.	VOLTS	MaH	TERMINAL	KIT NO.	DIMENSIONS	COMMENTS
60-84306A65 same as **60-5309A01**	A	1.34	2,400	Flat	NLN-8277A	1.953″ x .535″	"AA" cell for tone only PAGEBOY II Pager
60-5633A01	B	1.4	1,000	Flat	NLN-6199A	1.123″ x .448″	For tone and voice PAGEBOY II, PAGECOM MINITOR and DIRECTOR Pagers.
60-82292H01	C	8.4	1,000	Flat	SLN-6099A	3.900″ x .662″ x .648″	
60-82325J01	D	14.0	2,400	Flat	NLN-8095A	5.650″ x 2.400″ x .650″	Sealed package for HANDIE-COM Radio
60-82357J01	E	1.4	2,400	Flat	NLN-8104A	1.953″ x .535″	"AA" cells for HANDIE-COM Radio order holder NLN-8106A separately.
60-83582H01	F	16.2	1,000	Flat	NLN-6683A	2.760″ x 2.170″ x .760″	For HT-220 Slimline Housing
60-84342H01	G	16.2	1,800	Flat	NLN-6762A	2.760″ x 2.170″ x 1.265″	For HT-220 omni-housing, low power
60-84815H01	H				NLN-6936A		For HT-220 omni-housing, high power
60-82668D01	I	16.2	1,800	Flat	NLN-6239A	2.76″ x 2.17″ x 1.265″	For HT-200

NEN-6034A Box of 24 60-5633A01

Alkaline

60-82389J01	J	1.5		Flat	NLN-8105A	1.96″ x .562″	"AA" cell for HANDIE-COM Radio. Supplied in packs of 10, order holder NLN-8106A separately.
60-82728J01	K	9.0		Snap	NLN-8233A	1.91″ x 1.03″ x .66″	
60-83062J01	L	15.0	18,000	Flat	NLN-8470A	5.65″ x 2.400″ x .650″	Sealed package for HANDI-COM Radio
60-5310A01	M	1.4	1,800	Miniature "AA"	NLN-8278A	1.955″ x .550″	"AA" cell for tone only PAGEBOY II Pager. Also METRX.

Rechargeable Alkaline

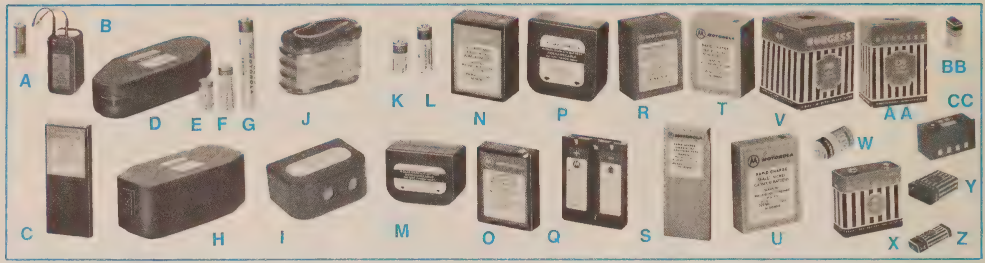
60-84308A15	N	4.5	2.5 AH	3 "D" cell Flashlight		7.1562″ x 1.3437″	

Carbon-Zinc

PART NO.	FIG.	VOLTS	TERMINAL	KIT NO.	DIMENSIONS	COMMENTS
60-847629	O	7.5	3 Hole Socket	NU-126	3″ x 2 3/16″ x 1 15/16″	
60-847888	P	6.0	2 Hole Socket	NU-144	2 9/16″ x 2 9/16″ x 4″	
60-848432	Q	6.0	Flat (Flashlight)	NU-125	2 11/32″ x 1 9/32″ x 1 9/32″	
60-855262	R	1.5	Flat "N" size			For Low-Frequency Paging
60-82457B01	S	22.5	no. 8-32 studs with hex nuts	SLN-6030A	3.468″ x 2.875″ x 2.062″	
60-82458B01	T	1.5	Flat (Flashlight "C")	SLN-6030A	1.950″ x 1.005″	"C" cell

NLN-6310A Kit of 11 industrial "D" cells.
NLN-6406A Kit of 22 industrial "D" cells.

Batteries



Nickel Cadmium (Not fully charged when shipped)

PART NO.	FIG.	VOLTS	MaH	KIT NO.	DIMENSIONS	COMMENTS
60-5104A01	A	1.2	135	NLN-8276A NLN-6965A	1.228″ x .470″	For tone and voice PAGEBOY II and PAGECOM Pagers
60-5222C03	CC	7.5	4000	NLN-8833A	2.730″ x 1.410″ x 4.44″	MX 300 Ultra-high capacity 7/14 HR charge
60-82132J01	B	9.6	450	NLN-8047A	2.687″ x 1.375″ x 1.156″	
60-82324J01	C	13.0	500	NLN-8002A	5.650″ x 2.405″ x .650″	For HANDIE-COM Radio
60-82447G01 Use NLN-6267A	D	14.0	780	NLN-6267A	7.0″ x 2.78″ x 1.46″	For NPN-1007A and NPN-6031A, PT 200/300 power packs
60-83009H01	E	2.5	140	NLN-6394A	1.364″ x .675″	For VHF tone only PAGEBOY I Pager
60-83009H02	F	3.75	140	NLN-6431A	2.010″ x .675″	For VHF tone and voice PAGEBOY I Pager
60-83009H03	G	7.5	140	NLN-6117A	3.950″ x .675″	
60-83420D01	H	15.0	3.5 (Amp)	NLN-6408A	7.660″ x 3.240″ x 2.590″	For NPN-1006A and NPN-6038A PT 400 power packs
60-83464D01	I	14.4	132	ZLN-6091A	2.87″ x 2.01″ x 1.32″	
60-83605E01	J	10.0	390	NLN-6586A	1.66″ x 1.45″ x 2.76″	
60-83778H02	K	2.5	140	NLN-6810A	1.50″ x .675″	For VHF tone only—U.L. listed PAGEBOY I Radio
60-83778H03	L	3.75	140	NLN-6811A	2.135″ x .675″	For VHF tone and voice—U.L. listed PAGEBOY I Radio
60-83893E01	M	10.0	132	NLN-6607A	2.87″ x 2.01″ x 1.32″	For HT-200 hazardous duty radios. **NOTE:** radio not "intrinsically" safe with this battery.
60-84642H01	N	15.6	450	NLN-6761A	2.760″ x 2.175″ x 1.265″	For HT-220 omni-housing radio
60-84643H01	O	15.6	225	NLN-6682A	2.760″ x 2.175″ x .760″	For HT-220 slimline housing radio
60-84735H01	P	15.6	500	NLN-6238A	2.885″ x 2.81″ x 1.33″	For HT-200 radio
60-84184H02	Q	16.5	70	NLN-6781B	3.33″ x 2.62″ x .42″	For HT-100 radio

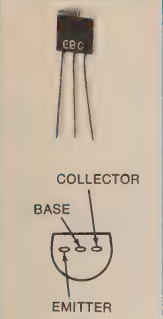
Rapid Charge Nickel Cadmium (Not fully charged when shipped)

PART NO.	FIG.	VOLTS	MaH	KIT NO.	DIMENSIONS	COMMENTS
60-5201E01	CC	7.5	2000	NLN-8834B	2.730″ x 1.410″ x 1.83″	MX 300 Med. capacity 1 HR charge
60-5201E02	CC	7.5	4000	NLN-8835B	2.730″ x 1.410″ x 3.40″	MX 300 High capacity 1 HR charge
60-5224C03	CC	7.5	2000	NLN-4002A	2.730″ x 1.410″ x 1.47″	MX 300 Light capacity 1 HR charge
60-5295A03 Use NLN-8232B	R	16.0	450	NLN-8232B	2.760″ x 2.175″ x 1.265″	For HT-220 omni-housing, "intrinsically" safe radios.
60-82387J01	S	13.0	500	NLN-8096A	5.650″ x 2.405″ x .650″	For HANDIE-COM Radios
60-84636H01	T	15.8	450	NLN-6900A	2.76″ x 2.175″ x 1.26″	For HT-220 omni-housing radios
60-84641H01	U	15.8	225	NLN-6899A	2.76″ x 2.175″ x .76″	For HT-220 slimline housing

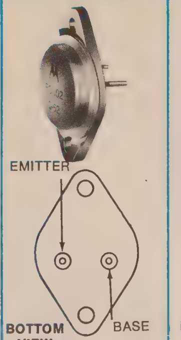
Miscellaneous

PART NO.	FIG.	VOLTS	KIT NO.	DIMENSIONS	COMMENTS
60-82104C01	V	1.5	NLN-6143A	2.812″ x 2.625″ x 2.625″	
60-82455G01	W	1.5	NLN-6020A	2.263″ x 1.343″	Heavy Duty Industrial "D" cell
60-847252	X	67.5	NU-125	2⅝″ x 1¼″ x 2¼″	
60-852117	Y	67.5		3.718″ x 2.812″ x 1.375″	
60-824625	Z	30.0	TU-106	2.562″ x 1.031″ x .625″	
60-82145C01	AA	45.0	NLN-6144A	4.062″ x 3.00″ x 2.312″	
60-82282C01	BB	9		1.906″ x 1.03″ x .687″	

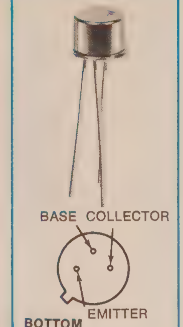
The Rog Program



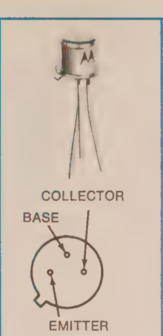
BOTTOM VIEW
48-83750G01



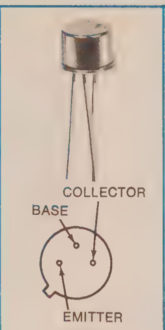
BOTTOM VIEW
48-83750G02



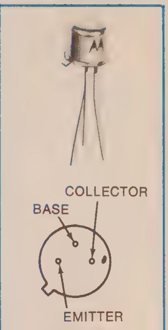
BOTTOM VIEW
48-83750G03



BOTTOM VIEW
48-83750G04



BOTTOM VIEW
48-83750G05



BOTTOM VIEW
48-83750G06

Advanced Motorola Engineering Enables You To Replace 98 Transistors with 6

Transistor replacement has been a growing problem, especially in light of the numbers of transistors used, as well as the large amount of communications equipment which requires servicing. Just as important as technical skill is quality and *availability* of replacement parts. Motorola has taken a giant step in reducing the problem of having enough of the right transistors on hand in service shops by the ROG replacement transistor program. Six transistors can now serve as direct replacement for 98 previous transistors.

What It Means To You

The benefits to the service man are many: Primarily, ROG reduces his inventory and ordering problems. With only six transistors to order, and stock, inventories become smaller and more economical. You can service a greater amount of equipment, more effectively and more economically. With the easy availability of these parts, customer down time is reduced. Both order processing time and shipment money is saved as fewer orders are needed. Storage problems in vans are reduced; you can always take the materials to do the job right to the customer.

48-83750G01 NPN Replaces

TYPE	PART NUMBER
T1679	48-869037
T2515	48-869037
M9136	48-869136
M9245	48-869245
M9299	48-869299
M9323	48-869323
M9325	48-869325
M9329	48-869329
M9338	48-869338
M9357	48-869357
M9377	48-869377
M9378	48-869378
M9389	48-869389
M9390	48-869390
M9418	48-869418
M9453	48-869453
M9532	48-869532
M9570	48-869570

48-83750G02 PNP Replaces

TYPE	PART NUMBER
2N176 (wht)	48-124285
XN12F	48-125219
MN22	48-125266
MN23	48-125267
MN46	48-125298
2N176	48-134447
2N376A	48-134571
2N176 (wht/brn)	48-134582
2N176 (wht/red)	48-134583
2N176 (wht/grn)	48-134584
2N176 (wht/grn/grn)	48-134620
M4608	48-134608
M4661	48-134661
M4206	48-124206
M4246	48-124246
M9083	48-869083
M9091	48-869091
M9104	48-869104
M9142	48-869142
M9255	48-869255
M9294	48-869294
M9342	48-869342
M9420	48-869420
M9458	48-869458
M9517	48-869517

48-83750G03 NPN Replaces

TYPE	PART NUMBER
M4630	48-134630
M9052	48-869052
2N2218	48-869061
M9125	48-869125
M9147	48-869147
M9174	48-869174
M9186	48-869186
M9187	48-869187
SM2716	48-869209
M9260	48-869260
M9271	48-869271
M9285	48-869285
M9355	48-869355
M9430	48-869430
M9431	48-869431
M9491	48-869491
M9519	48-869519

48-83750G04 NPN Replaces

TYPE	PART NUMBER
M4590	48-134590
M4608	48-134608
M9002	48-869002
M9002 (red)	48-869016
M9059	48-869059
M9070	48-869070
M9096	48-869096
M9110	48-869110
M9144	48-869144
M9199	48-869199
M9366	48-869366

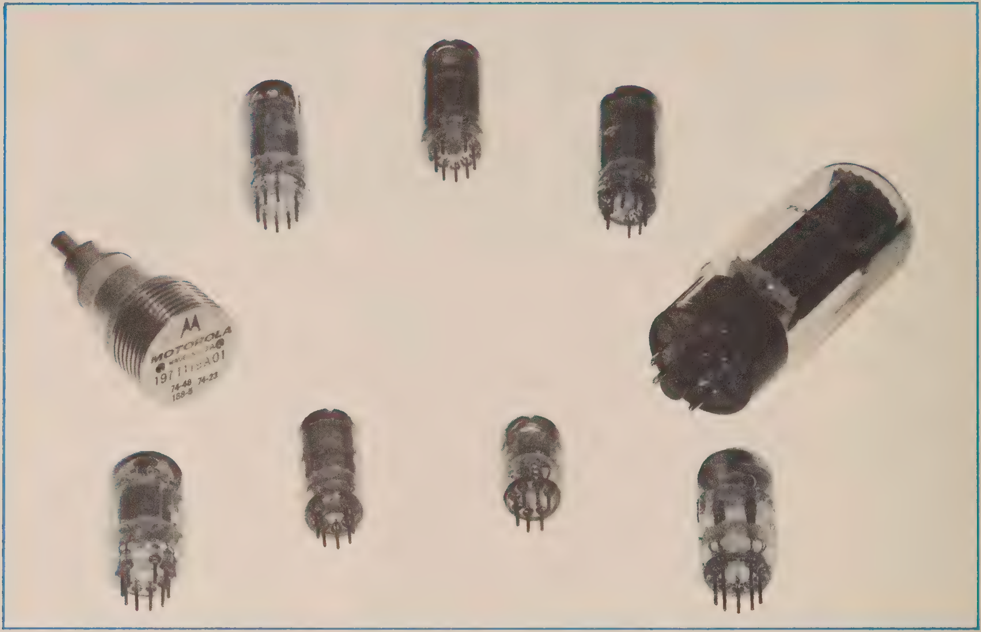
48-83750G05 PNP Replaces

TYPE	PART NUMBER
MN60	48-124317
2N652	48-124319
2N207	48-124322
2N655	48-124327
2N655 (grn)	48-134483
2N1193	48-134500
M4573	48-134573
M4597	48-134597
M4597 (grn)	48-134599
M4607	48-134607
2N207 (blu)	48-134633
M9105	48-869105
M9105 (blu)	48-869113
M4573 (blu)	48-869201
M9518	48-869518

48-83750G06 PNP Replaces

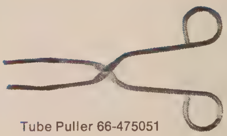
TYPE	PART NUMBER
M9003	48-869003
M9009	48-869009
M9038	48-869038
M9003 (wht)	48-869040
M9003 (org)	48-869041
M9058	48-869058
M9003 (brn)	48-869071
M9080	48-869080
M9081	48-869081
M9098	48-869098
M9190	48-869190
M9003 (grn)	48-869192
M9258	48-869258

Tubes



MOTOROLA TUBES ARE THOROUGHLY TESTED

We look everywhere to find the best sources for each tube, then test them continuously and thoroughly to be sure the tube fits the application. Sometimes, our engineering staff tells us that the best we can buy is not good enough. Then we design one that is, evaluate it and make it into the most dependable component we can. Tubes that bear the Motorola name are truly champions. They are rated for reliability, stronger and will last longer. Motorola sells only tubes rated for "heavy duty industrial service" because anything with a lesser rating will not provide the dependable service you have come to expect from us. You know that the tubes you receive from us are dependable, because they are pre-aged and tested before we put our name on them. Tubes which don't meet our standards are returned to the supplier, *without the Motorola name on them.*



Tube Puller 66-475051

Receiving Tubes

Common tubes used with Motorola equipment and available from your Motorola Communications Division Parts Department.

TYPE
1B3GT
2C39A
use 197-119A01
3A2
3AT2
3A3B
use 3A3C
3AW3
use 3A3B
5U4GB

TYPE
5Y3GT
6AB4
6AF3A
6AF4A
6AH6
6AK5
6AK6
6AL3
6AL5
6AM4

TYPE
6AM8
6AN4
6AN8A
6AQ5A
6AQ6
6AS6
6AT6
6AU5GT
6AU6

TYPE
6AU6A
use 6AU6
6AU8A
6AV6
6AW8A
6BA6
6BA7
6BC4
6BC5/6CE5
6BC8
6BE6
6BF7
6BG7
use 6BF7
6BH6
6BJ6
6BL8/ECF80
6BM8/ECL82

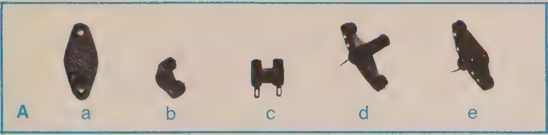
TYPE
6BN6
6BN8
6BQ5
6BQ7A
6BR8A
6BS8
6BZ6
6C4
6CA4
6CB5A
6CB6A
6CF6
use 6CB6A
6CG7
use 6FQ7
6CG8A
6CH3
use 6CJ3

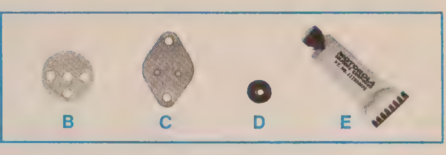
TYPE
6CJ3
6CL3
use 6CJ3
6CL6
6CL8A
6CM6
6CM8
6CY5
6DC6
6DE7
6DJ8
6DL4
6DQ6B
6DT6
6DV4
6DW4A
use 6CJ3
6EA8

TYPE
6EV5
6EW6
6FG6
6FQ7
6GH8A
6GK6
6J4
6J6
6JN6A
6L6
use 6L6GC
6L6GC
6SJ7
6SL7GT
6SN7GTB

TYPE
6T8
6TF4
6U8
6V6
6X4
6X4W
use 6X4
7C5
7C7
12AB5
12AL5
12AT7
use 12AT78M
12AT78M
12AU6

TYPE
12AU7A
12AV6
12AV7
12AX7
12AY7
12BA6
12BE6
12BH7A
12BR7
12BY7A
use
65-83735A02
35W4
50C5





Transistor and Diode Mounting Kit and Accessories

Transistor Sockets

A 2 pin, molded sockets.

9-850066 (a)
9-851303 (b)
9-82287A01 (c)
9-82377H01 (d)
9-82673A01 (e)

Transistor Insulators

B Insulators for stud-type power transistors.

14-851751	1″ diameter x .002 thick.
14-865820	1¼″ diameter x .002 thick.

C Insulators for standard power transistors with 1 3/16″ mounting centers.

14-82399B01	3/32″ lead holes and 3/32″ mtg. holes x .002 thick
14-857437	¼″ lead holes and 5/32″ mtg. holes x .002 thick
14-865875	3/32″ lead holes and 5/32″ mtg. holes x .005 thick
14-868505	5/32″ lead holes and 3/32″ mtg. holes x .005 thick

Transistor Shoulder Washers

D Shoulder washers for insulating mounting bolts or studs for power transistors.

14-857512	For #4 bolt to mount in 5/32″ chassis hole.
4-868830	For #6 bolt to mount in 7/32″ chassis hole.
4-852296	For #8 & 10 to mount in ¼″ chassis hole.

Silicone Compounds

E Recommended when installing power transistors, sealing antenna and R.F. connections, weatherproofing ignition systems or can be used as a lubricant for switches, cams, etc.

11-834678	¼ oz. tube
11-490487	8 oz. tube

Heat Sink Compounds

Grease-like silicone material, heavily filled with heat-conductive metal oxides provides high thermal conductivity.

11-10027A26	Dow Corning, 5 oz. tube
11-83166A01	Wakefield, 2 oz. tube

Special Purpose Tubes

Common tubes used with Motorola equipment and available from your Motorola Communications Div. Parts Dept.

TYPE
OA2
OB2
OC2
OC3
OD3

1AD4
ML2C39WA use 197-119A01
2D21
2E24

2E26
2E36
3B4
3B28
4/125A use 6155U

4D21 use 6155U
4CX250B
5R4GYB

TYPE
6AS6
6AS7GA
6BF7
6BG7 use 6BF7

100TH
254W
807
816
829B

866A
955
2050 use 2050B
5651
5654

CK5672
CK5678
5686
5687

TYPE
5725 use 5725/6AS6W

57268M
5751
5763
5814A
5829

5894
5963
5965
6080
6136

6146 use 8298
6155 use 6155U
6155U

TYPE
6201
6360
6397
6476
6550

6661 use 6BH6
6662 use 6BJ6
6669

6676 use 6676/6CB6A
6676/6CB6A
6678 use 6678/6U8A

6678/6U8A
6679
6680
6681
6883 use 8032

TYPE
6897 use 197-119A01
6907
6922

6939
7054 use 8077/7054
7055
7056

7058
7059
7060
7061
7119

7167
7258
7377
7551
7558

TYPE
7735AM Vidicon use 65-82292D01

7984

8032
8042
8058
8072
8077/7054

8102
8106
8156

8298
8445 use 6EA8
8446 use 6CL8A

TYPE
8447 use 12BR7
8458
8489 use 6AN8A

8552
8560A use 65-83382D02
8643 use 97-136A01

65-83382D02
65-83735A02
97-136A01
97-136A02

197-123A01 matched 5886

Picture Tubes

TYPE
9SP4
14WP4
19AFP4 use 19FHP4

TYPE
19AVP4
19EBP4 use 96-138A01
19EYP22

TYPE
19FHP4
19GWP22 use 19EYP22

TYPE
19XP4 use 19AVP4
21GCP4

TYPE
ST4716A use ST4716E
ST4716E

TYPE
CE110/M9P4S use 96-208A01
CE-176A/M15P4T use 96-219A01
D7200GH (S-1327)

Klystrons (Microwave)

TYPE
65-841282
65-841283

TYPE
65-878978
65-85299C02

TYPE
65-85299C03
65-85299C04

TYPE
65-86160A01
65-86176A01

TYPE
65-86177A01
65-86190C01

TYPE
65-86190C02
65-89003A01

SPARE-PAC Spare Parts Kits

Save Time, Space & Money with SPARE-PAC Spare Parts Kits

- virtually every part you need for normal service
- available in 2 versions . . . one for 50% service coverage, one for 90% coverage
- reduces down-time, maximizes use of equipment
- conveniently supplied in cartons with individual storage bins
- includes computer print-outs to simplify inventory & help control stock levels
- conveniently transported from shop to vehicle to remote service point
- compact carton saves storage space
- permits economical decentralization of parts inventories

Keep your radios "on-the-air" with the repair parts you need, individually packaged and identified by Motorola part number, conveniently available in a compartmentalized heavy-gauge cardboard container.

With Spare-Pac you can replace several hundred line items on your purchase order with just one item. This reduces ordering costs and helps you make more profitable use of your time by eliminating hours of tedious paperwork.

Control of your parts inventory is simplified with a detailed parts list that allows you to easily keep track of parts used and facilitates re-ordering before inventories are depleted. In effect, Spare-Pac gives you an operational self-controlled inventory system which saves handling and storage expenses and permits economical decentralization of parts inventories.

Designed with the aid of a computer, each Spare-Pac spare parts kit contains an initial inventory of parts to repair most failures in a particular series of radios. With the exception of rural telephone radios, kits are available in two contingency levels, "A" and "B." Rural Telephone Radio SPARE-PAC Spare parts kits are available only in the higher contingency level (equivalent to "B" suffix).

The economical "A" kit contains the correct items in sufficient quantity to repair approximately 50% of the failures in a radio. The more complete "B" kit extends the capability to 90%. Failures that cannot be repaired with the "B" kit can generally be considered abnormal due to accidents or physical abuse.

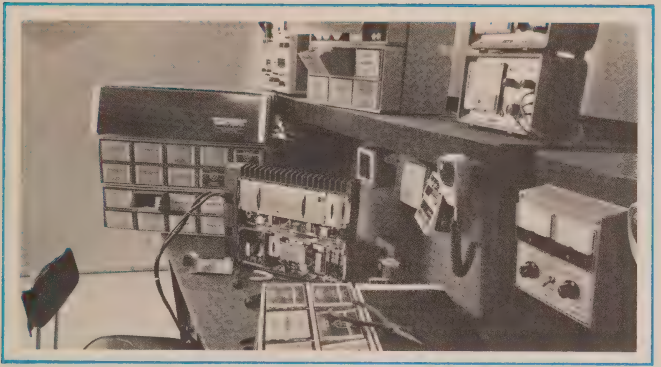
SPARE-PAC Spare Parts Kits are intended to provide an initial start up inventory. Based on the chart, following page, sufficient parts are supplied to satisfy "spares" requirements for one year under normal usage. To minimize downtime, the parts assortment in each kit is designed to cover a maximum range of potential failures within a given contingency level. This initial inventory investment assures that the required parts are on hand when needed. Contents of each kit should be periodically reviewed and replaced as required. Replacement accessory items such as microphones, speakers, and cable kits should be ordered separately.

Due to the variety of options available for the HT-220 Series radios, it is impractical to include batteries, various housing parts and accessories in the HT-220 SPARE-PAC kits. The chart below gives suggested quantities of the items necessary to complete your spare parts inventory.

Please refer to your service manual for specific part numbers, or provide us with the complete model number of your radio and we will provide the required part numbers.

As a typical example, SPK-107A for MICOR Radios, 132-174 MHz, 90 and 110 watt models contains a total of 262 pieces of 106 different items as follows: 4 resistors (3 types, precision), 78 capacitors (40 types), 116 semiconductors (33 types), 7 integrated circuits (5 types), and 57 miscellaneous items (25 types) including RC networks, connector assemblies, sockets, connectors, phone jacks, fuse holders, potentiometers, switches, speakers, microphones, magnets, fuses, tools and relays.

By comparison, the SPK-107B contains a total of 1,637 pieces of 270 different items as follows: 1,018 resistors (106 types, precision and carbon), 261 capacitors (76 types), 27 coils (10 types), 4 transformers (2 types), 133 semi-conductors (33 types), 11 integrated circuits (5 types), 183 miscellaneous items (38 types) including insulators, plugs, buttons, contacts, and ferrite beads in addition to those miscellaneous items included in the "A" kit.



Radios in Service vs. Recommended No. of Kits

See separate chart for Multi-channel Rural Telephone SPARE-PAC Spare Parts Kits (SPK-111 through SPK-113).

Radios in Service*	1-5	6-15	16-30	31-50	approximately 1 per 20 radios over 50
Recommended No. of Kits	1	2	3	4	

The number of Spare-Pac spare parts kits required depends on the number of radios in service.

Multi-Channel Rural Telephone Subscribers in System vrs. Recommended No. of kits.

Subscribers	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Recommended No. of SPK-111 & SPK-113** Kits	1	2	3	4	5	6	7	8	9	10
Recommended No. of SPK-112** Kits	1	1	1	1	1	1	1	2	2	2

SPARE-PAC Spare Parts Kits are Currently Available for the Following Radios:

MOCOM·70 Radios (136-174 MHz)

SPK-101A	30 watt models
SPK-101B	30 watt models
SPK-102A	45 watt models
SPK-102B	45 watt models
SPK-103A	60 watt models
SPK-103B	60 watt models
SPK-104A	100 watt models
SPK-104B	100 watt models

MOCOM-70 UHF Radios (450-512 MHz Range)

SPK-119A	16, 22 and 25 watt models
SPK-119B	16, 22 and 25 watt models
SPK-120A	39 and 50 watt models
SPK-120B	39 and 50 watt models

MICOR Radios (132-174 MHz)

SPK-105A	45 watt models
SPK-105B	45 watt models
SPK-106A	60 watt models
SPK-106B	60 watt models
SPK-107A	90 & 110 watt models
SPK-107B	90 & 110 watt models

MICOR UHF Radios (450-470 MHz Range)

SPK-115A	25 watt models
SPK-115B	25 watt models
SPK-116A	45 watt models
SPK-116B	45 watt models
SPK-117A	75 watt models
SPK-117B	75 watt models
SPK-118A	100 watt models
SPK-118B	100 watt models

PULSAR VHF Mobile Telephone Radios

SPK-109A	20 & 12 watt models
SPK-109B	20 & 12 watt models

HT-220 HANDIE-TALKIE Radios (136-174 MHz)

SPK-108A	1-5 watt models
SPK-108B	1-5 watt models

UHF-HT-220 Portable Radios (401-512 MHz Range)

SPK-114A	1, 3.5 & 4 watt models
SPK-114B	1, 3.5 & 4 watt models

Order Separately for HT-220 HANDIE-TALKIE Radios

Item	**Suggested Number of Spares**
Mercury batteries	as required
Nickel-Cadmium batteries	2 for every 30 units or as required
Front and Rear Covers	1 for every 15 units
Battery Covers	1 for every 5 units
Speaker/Microphone (if applicable)	1 for every 10 units
All other accessories	1 for every 25 units

VHF Rural Telephone Radios

SPK-110	Single-channel Radio MRT 150-S & R (Magneto, E & M, and repeater radios).
SPK-111	Multi-channel Radio MRT-150M (subscriber and base radios).
SPK-112**	Multi-channel terminal MRT 150M
SPK-113**	Multi-channel terminal supplementary expansion kit (subscriber termination and channel termination modules).

Note: VHF Rural telephone Radio SPARE-PAC Spare-parts kits are available only in 90% contingency level equivalent to "B" suffix.

MICOM HF-SSB Radios (2-9 MHz—2-18 MHz Range)

MOBILE AND BASE STATION RADIOS

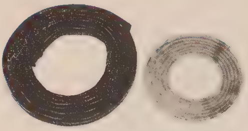
SPK-121A	60 watt mobile radios
SPK-121B	60 watt mobile radios
SPK-122A	125 watt mobile radios
SPK-122B	125 watt mobile radios
SPK-123A	60 watt base stations
SPK-123B	60 watt base stations
SPK-124A	125 watt base stations
SPK-124B	125 watt base stations
SPK-125A	125 watt (RTTY) base stations
SPK-125B	125 watt (RTTY) base stations
SPK-126	60 and 125 watt antenna tunes
SPK-127	60 and 125-watt 6-dipole switch

Note: SPK-126 and SPK-127 spare parts kits are available only as full complement kit. (No "A" or "B" version suffix kits).

***Note:** Count single-channel rural telephone repeaters as two radios.

****Note:** Two SPARE-PAC Spare parts kits (SPK-112 and SPK-113) are required to cover the Muiti-Channel terminal. Order recommended number as indicated in chart.

Sleeving, Wire and Cable



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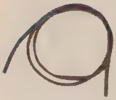

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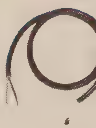

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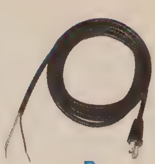

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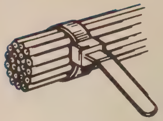

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Sleeving Kits and "HANDIE-TALKIE" Radio Wire Kit—Fig. A

11-410141	#16 Clear Tubing—25-ft. Spools
11-400414	#22 Clear Tubing—25-ft. Spools
PDK-1111	Yellow Varnished Sleeving Kit consists of 120 ft. of sleeving—9′ of #7, 30′ of #10, 30′ of #18 & 51′ of #20. Supplied in 3 ft. lengths
PDK-1112	Black Vinyl Sleeving Kit consists of 141 ft. of sleeving—30′ of #3, 51′ of #8, 30′ of ⅜″ I.D., & 30′ of 7⁄16″ I.D. Supplied in 3 ft. lengths
PDK-1113	Black Vinyl Sleeving Kit consists of 75′ of sleeving—25′ of ½″ I.D., 25′ of ⅝″ I.D., & 25′ of ¾″ I.D. Supplied in one-piece, running lengths
PDK-1114	Clear Vinyl Sleeving Kit consists of 75 ft. of sleeving—25′ of #3, 25′ of #8 & 25′ of ⅜″ I.D. Supplied in one-piece, running lengths.
PDK-102	Teflon Wire Kit contains an assortment of the most often used miniature wires found in pocket receivers, transmitters, etc. Wire supplied is special #26 gauge

Line Cord

PART NO.†	FIG.	DESCRIPTION
PK-401	B	Stranded Line Cord 2 Cond. 18 Ga. with Polyvinyl Choride Insulation. (Consists of 100 ft. of 30-83155H01)
PK-402	B	Same as above except has heavier insulation. (Consists of 100 ft. of 30-825430)
PK-389	C	Round type A.C. Line Cord, 2 cond. 18 ga. (Consists of 100 ft. of 30-892533)
30-892534	D	A.C. Line Cord, 10 ft., 2 conductor with 2 prong plug.
30-865903	D	A.C. Line Cord, 8 ft., 3 conductor with 3 prong plug.
30-824772	D	Standard cord w/plug 9 ft.

Cable Ties—Fig. E
In Packages of 1000 Ties

42-80313A70	Overall length 3¾″. Maximum bundle diameter ⅝″.
42-80313A71	Overall length 8⅛″. Maximum bundle diameter 2″.

Coaxial Cable Cross Reference Chart

RG-/U	Motorola Part No.†		U/M	Cent. Cond.	Dielectric	Shield Qty.	Jacket	Overall Diam.	Zo
174	**PK-369**	(Replaces 30-840807)	100 FT BOX	Str.	P.E.	1	PVC	.100	50
188	**PK-370**	(Replaces 30-868714)	50 FT BOX	Str.	Tef.	1	Teflon	.102	50
		(Replaces 30-859004)	50 FT BOX	Str.	Tef.	1	Teflon Tape	.110	50
		(Replaces 30-83794C01)	50 FT BOX	Str.	Tef.	2	Glass Braid	.120	50
58A	**PK-362**	(Replaces 30-475378)	100 FT BOX	Str.	P.E.	1	PVC	.195	50
9	**PK-609**	(Replaces 30-84604A01)	50 FT BOX	Str.	P.E.	2	PVC	.420	50
59	**PK-403**	(Replaces 30-471240)	100 FT BOX	Sol.	P.E.	1	PVC	.237	73
11	**PK-367**	(Replaces 30-50741)	100 FT BOX	Str.	P.E.	1	PVC	.405	75
303	**30-83182A01**		*	Sol.	Tef.	1	Teflon	.170	50
—	**30-82921H01**		*	Str.	Tef.	1	Teflon	.200	50
142B	**30-83278B01**		*	Sol.	Tef.	2	Teflon	.200	50
—	**30-852190**		*	Str.	Tef.	2	Teflon	.385	50
8	**30-82345**	Order under PK number on opposite page		Str.	P.E.	1	PVC	.405	52
—	**30-82793C01**		*	Sol.	P.E.	Triax	P.E.	.475	75

*Available in running feet.
†Order all cable under PK number where shown. Available only in standard length indicated.

MOTOROLA
Hook-up Wire

A

B

Wire Assortments

A Convenient assortment of 12, 100 ft. spools of irradiated PVC hook up wire complete with handy metal rack. Kits consist of two each of the colors listed below.

PDK-3010	20 Gauge Assortment
PDK-3011	24 Gauge Assortment
ST-185	Metal Rack Only

Irradiated PVC Hook Up Wire (100 Foot Spools)

20 GAUGE STRANDED	COLOR	24 GAUGE STRANDED
30-84208D44	Red	**30-84208D54**
30-84208D46	Yellow	**30-84208D56**
30-84208D47	Green	**30-84208D57**
30-84208D48	Light Blue	**30-84208D58**
30-84208D51	White	**30-84208D61**
30-84208D52	Black	**30-84208D62**

Shrink Tubing

B Use shrink tubing to insulate wire splices and critical components from near shorts. Application of heat shrinks tubing around component for snug fit.

CLEAR	EXPANDED I.D. MIN	BLACK
11-132026 (4 FT/PK)	3⁄16″	**37-132251**
37-132049 (4 FT/PK)	¼″	**37-135566**
11-134165 (4 FT/PK)	⅜″	**37-134371**
37-132562 (4 FT/PK)	⅛″	**37-134389**
11-132057 (4 FT/PK)	½″	
—	¾″	**37-134370**

Coaxial Cable

Meets rigid specifications. Low loss polyethylene dielectric. Copper shielded and vinyl outer jacket.

Standard Lengths of RG8/U and RG58A/U

STD. LENGTH	FOR RG8/U (30-82345)† ORDER	FOR RG58A/U (30-475378)† ORDER
100 ft/bx	**PK-358**	**PK-362**
250 ft/rl	**PK-359**	**PK-363**
500 ft/rl	**PK-360**	**PK-364**
1000 ft/rl	**PK-361**	**PK-365**

Other Cable

ORDER NO.†	RG NO.	DESCRIPTION	IMP	LGTH.
PK-609	RG9/U	(30-84604A01)	50	50 ft.
PK-367	11/U	(30-50741)	75	100 ft.
PK-403	59/U	(30-471240)	73	100 ft.
PK-610	RG142B/U	(30-83278B01)	50	50 ft.
PK-369	174/U	(30-840807)	50	100 ft.
PK-370	188/U	(30-859004)	50	50 ft.

Battery Cable

High quality power cable for replacement of damaged battery-to-fuse block jumpers or relay-to-mobile power cables.

ORDER NO.†	COND. SIZE	COLOR	DESCRIPTION	LGTH.
PK-378	2	Red	(30-830315)	100 ft.
PK-379	4	Red	(30-81067)	100 ft.
PK-380	4	Brown	(30-81068*)	100 ft.
PK-381	6	Red	(30-812504)	100 ft.
PK-382	6	Black	(30-825602)	100 ft.
PK-383	8	Red	(30-812505)	100 ft.
PK-384	10	Red	(30-813233)	100 ft.
PK-385	10	Black	(30-831572)	100 ft.
PK-386	12	Black	(30-858552)	100 ft.
PK-387	12	Red	(30-858553)	100 ft.
PK-388	14	Red	(30-82724C01)	100 ft.

*Has black and red tracers.

Multi-Conductor Cable

Standard Cable

Available from 2 to 8 conductors. Can be used for intercoms, remote desk set hook-ups, etc.

Special Cable

6 to 17 conductor for mobile control cable use.

ORDER NO.†	NO. CONDUCT. AND GAUGE	DESCRIPTION	LGTH.
PK-390	4-18 GA.	(30-83743)*	100 ft.
PK-391	4-20 GA.	(30-800972)	100 ft.
PK-392	5-18 GA.	(30-483756)*	100 ft.
PK-393	6-20 GA.	(30-80203)	100 ft.
PK-394	4-22 GA. 2-18 GA.	(30-852364)*	
PK-395	7-20 GA.	(30-892218)	100 ft.
PK-396	8-20 GA.	(30-483718)	100 ft.
PK-398	10-24 GA. 2-18 GA.	(30-830032)	50 ft.
PK-399	9-20 GA. 4-18 GA.	(30-858513)	50 ft.
PK-400	13-20 GA. 4-18 GA.	(30-864650)	50 ft.

*Non-shielded cable.

Shielded Audio Cable

#24 stranded inner conductor, vinyl outer jacket. Used in audio circuits of mobile and base station transmitters.

ORDER NO.†	JACKET COVER	DESCRIPTION	LENGTH
PK-371	Blue	(30-824273)	100 ft.
PK-372	Green	(30-824274)	
PK-373	Black	(30-824275)	
PK-374	Red	(30-824277)	
PK-375	Orange	(30-824278)	
PK-376	Yellow	(30-824279)	
PK-377	White	(30-824280)	

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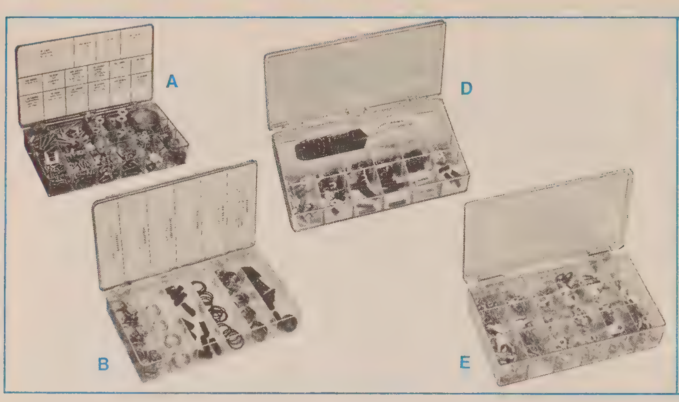
†Order all cable under PK number where shown. Available only in standard lengths indicated.

Miscellaneous Hardware



MOTOROLA
Parts Rack
C

Mobile Installation Hardware Kit

A Forget about lost or missing installation hardware with this time and trouble saver! Each kit contains a generous supply of all the hardware you need for mobile installations—600 pieces in all, including a handy, 13-compartment plastic case. Self-tapping screws, bolts, washers and bushings of every useful size are supplied as well as 10 microphone hang-up plates. The contents of each compartment are identified by Motorola part number and description. This kit is a "must" in the shop and in every service van.

PDK-112 Hardware Kit

Mike and Control Cable Clamp Kit

Contains most clamps required to secure mike and control cables to handsets and control heads. This is an ideal kit for re-installation and mike repair. Kit contains 210 pieces.

PDK-427 Clamp Kit

Insulated Grommet Kit

Includes most of the commonly used Grommets in the two-way line. Most are not referenced in the manuals or shown elsewhere in the Buyer's Guide. Kit contains 441 pieces.

PDK-371 Grommet Kit

Insulated Clamp Kit

Includes rubber dipped metal clamps, chassis feed-thru cable clamps, plastic clamps and insulated feed-thru bushings ideal for fire wall applications. A time and money saver for those new installations. Kit contains 235 pieces.

PDK-425 Clamp Kit

Antenna Parts

B This assortment was specifically designed for Motorola's high band and 450MHz roof top series of antennas; TAD-6111A, 6112A, 6113A. Kit contains both electrical and mechancial components to service the complete line of these antennas.

PDK-114 Antenna Parts assortment kit

Two kits — one for electrical components and one for mechanical parts—provide a wide variety of parts to service 144-174 MHz and 406-470 MHz roof-top antennas. Kits include a generous supply of insulators, eyelets, bushings, ferrules, gaskets, hole plugs, etc. Use for TU-265, 308, 316, 360, NAD-6031A, 32A and P-8553B antennas. Each kit is packaged in a sturdy "see-thru" plastic box with identification of parts by Motorola number and description.

PDK-110	Electrical Components Antenna Replacement Kit
PDK-111	Mechanical Components Antenna Replacement Kit

Solderless Terminals Assortment in Free Metal Rack

C Motorola's line of "API" Terminals has been carefully selected to meet a wide variety of applications involving communications equipment. Solderless Terminals have characteristics which enable them to withstand maximum vibration and feature pull-out strength designed to approach closely the tensile strength of the wire. Insulated terminals are conveniently color-coded in red, blue, and yellow to readily identify wire size.

PDK-292	Solderless Terminal Assortment
ST-174	Rack Only
ST-130	Plastic Vial Only

Insulated Lug Assortment

D PDK-293 contains 12 of the most commonly used terminal lugs for radio servicing. Its selection of spade, tongue and wire splice lugs meet all standard wire sizes. "Super champ" crimper is also included for simplified bolt and wire cutting and stripping.

PDK-293	Insulated Lug Assortment
PDK-294	Insulated Lug Assortment less Crimping Tool

Non-Insulated Ring Tongue Assortment

E A generous assortment of 18 of the most commonly used tongue lugs for standard wire sizes. Here is a must assortment for on-the-spot maintenance of cables and other electrical accessories.

PDK-295 Ring Tongue Lug Assortment

Crystal and Channel Element Hold Down Kit

Contains most used clips for "Motrac"-"Motran," solid state base stations, tube type mobiles and tube type base stations. An ideal kit for refurbishing used equipment to give it that new maintained look. Kit contains 106 pieces.

PDK-426 Hold Down Kit

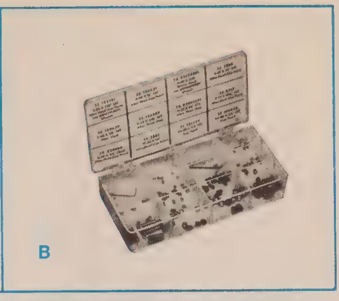
Insulated Coupling Loop Assemblies

Used in most "Motrac"-"Motran" and solid state base stations as well as in tube type "A" and "K" transmitters. Kit contains 20 pieces.

PDK-116 Kit

Hardware Assortments

MOBILE RADIO
Hardware
A



Hardware Assortment

A Contains 50 tubes of standard 4-40, 6-32, 8-32 and 10-32 slotted binder head machine screws. Sizes range from ¼″ to 1 inch. All have matching nuts, lockwashers, flat-washers and split washers. This generous assortment is rounded off with a selection of the most frequently used "specials" such as sleeves, rivets and speaker terminal pins. A sturdy, metal rack is included free with the complete assortment. All the contents of this assortment are listed in the chart at right.

- **50 Tubes of most commonly used hardware for 2-way radio servicing**
- **In clear plastic tubes**
- **Identified for ease of stock inventorying, reordering and selection**
- **On sturdy metal rack**
- **Easily mounted on a wall**
- **For service trucks as well as shops**

PDK-11A	Hardware Assortment
ST-103	Rack only
ST-130	Empty Tubes

Set Screw Assortment Kit

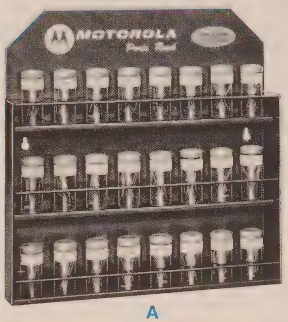
B Why spend valuable service time in fishing through a jumble of spare parts? Have this convenient kit at your fingers reach when a requirement for a lost or damaged set screw arises.

Here's an assortment of 150 Allen-Head set screws for a variety of applications in the electronic field. This kit provides sizes of 2-56, 4-40, 6-32, 8-32, 10-32 and ¼″ in commonly used lengths. Packaged in a sturdy constructed 12-compartment plastic box with an identification card affixed to the inside cover. Card provides the set screw sizes and Motorola part numbers for easy reordering.

PDX-312 Set Screw Assortment Kit

PART NO.	DESCRIPTION	APPROXIMATE NUMBER IN TUBE
#4-40 SCREWS, WASHERS AND NUT		
3-8022	4-40 x ¼″ Slt. Bin Machine Screw	75
3-1930	4-40 x ⅜″ Slt. Bin Machine Screw	75
3-1452	4-40 x ½″ Slt. Bin Machine Screw	50
3-1437	4-40 x ⅝″ Slt. Bin Machine Screw	50
3-2260	4-40 x ¾″ Slt. Bin Machine Screw	40
3-114832	4-40 x 1″ Slt. Bin Machine Screw	30
4-7683	#4 Internal Lockwasher	100
4-114583	#4 Split Lockwasher	100
2-7019	4-40 x ¼ x 3/32 Hex Nut	50
4-7607	9/32 x ⅛ x .027 Flatwasher	100
#6-32 SCREWS, WASHERS AND NUT		
3-7164	6-32 x ¼″ Slt. Bin Machine Screw	65
3-7229	6-32 x ⅜″ Slt. Bin Machine Screw	50
3-7362	6-32 x ½″ Slt. Bin Machine Screw	50
3-7342	6-32 x ⅝″ Slt. Bin Machine Screw	40
3-7346	6-32 x ¾″ Slt. Bin Machine Screw	30
3-7363	6-32 x 1″ Slt. Bin Machine Screw	25
4-7650	#6 Internal Lockwasher	100
4-7669	#6 Split Lockwasher	100
2-7005	6-32 x ¼ x 3/32 Hex Nut	50
4-1720	⅜ x .156 x .030 Flatwasher	100
#8-32 SCREWS, WASHERS AND NUT		
3-7154	8-32 x ¼″ Slt. Bin Machine Screw	50
3-9661	8-32 x ⅜″ Slt. Bin Machine Screw	50
3-7258	8-32 x ½″ Slt. Bin Machine Screw	40
3-7279	8-32 x ⅝″ Slt. Bin Machine Screw	30
3-7365	8-32 x ¾″ Slt. Bin Machine Screw	25
3-115341	8-32 x 1″ Slt. Bin Machine Screw	20
4-7651	#8 Internal Lockwasher	100
4-7671	#8 Med. Split Lockwasher	100
2-7003	8-32 x 5/16 x ⅛ Hex Nut	50
4-7562	7/16 x .187 x .033 Flatwasher	50
#10-32 SCREWS, WASHERS AND NUT		
3-121768	10-32 x ¼″ Slt. Bin Machine Screw	40
3-6963	10-32 x ⅜″ Slt. Bin Machine Screw	50
3-1209	10-32 x ½″ Slt. Bin Machine Screw	30
3-6946	10-32 x ⅝″ Slt. Bin MachineScrew	25
3-7385	10-32 x ¾″ Slt. Bin Machine Screw	20
3-118030	10-32 x 1″ Slt. Bin Machine Screw	15
4-7658	#10 Internal Lockwasher	100
4-7673	#10 Split Lockwasher	75
2-7048	10-32 x 5/16 x ⅛ Hex Nut	50
4-1712	7/16 x 13/64 x .033 Flatwasher	50
MISCELLANEOUS HARDWARE		
3-122897	4-40 x ¼″ Pln. Hex Lockscrew	35
3-122080	6-32 x ¼″ Pln. Hex Lockscrew	25
3-129281	6-32 x 5/16″ Phl. Rnd. Stl. Pol. Chr. Lockscrew	25
3-2941	6-32 x ¼″ Phl. Rnd. Stl. Pol. Chr. Machine Screw	25
3-124183	#8 x 1″ Pin. Hex Tapping Screw	15
3-8101	#8 x ½″ Stl. Pan Hd. Tapping Screw	40
37-61348	3/16 x ⅛ x ⅝ Neoprene Sleeve	30
PD-51	Assorted Rivets	100
29-82072D01	.125 Black Terminal Pin	6
29-82072D02	.125 White Terminal Pin	6

Resistor, Capacitor Assortments



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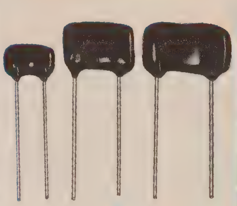

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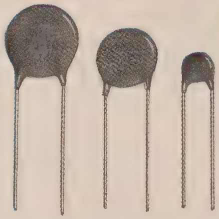

C

MOTOROLA RESISTOR FILE
RESISTOR FILE

D

Capacitor Assortments with Free Metal Rack

A These assortments put the capacitor you want at your fingertips. Sturdy, clear plastic tubes protect the capacitors during shop storage or field use. Each tube is readily identified by an appropriate label. Use the convenient metal rack on the bench or hang it on the wall.

ST-174 Rack Only

Dur-Mica

B The Dur-Mica capacitor replaces the molded mica and standard silver mica units formerly used in Motorola equipment. Special plastic coating on this capacitor provides added durability and improved moisture resistance, particularly in the higher temperature range. Dur-Mica capacitors operate efficiently from −40° to +100°C with temperature coefficients in the NPO range.

The Dur-Mica capacitor is the smallest mica capacitor available. These units meet or exceed all applicable MIL and EIA standards.

PDK-211 Dur-Mica Assortment

Ceramic Disc

C This convenient assortment of NPO, N, X, and Z capacitors includes the most commonly used values required for general day-to-day servicing.

Low inductance dipped ceramics for bypass, coupling and general applications in high-frequency circuits. Disc Ceramics (Sizes range from 7/32″ to ⅝″ dia.).

All ceramic capacitors are packaged 5 to a tube.

PDK-212 Ceramic Disc Assortment

Resistor Assortments

D Sturdy metal cabinet with resistors mounted on special file cards. Keeps resistors at your finger tips . . . easy to find.

ST-105 Cabinet Only

½-1-2-Watt Assortment

62 cards of the most commonly used values of ½-watt, 1-watt and 2-watt resistors for general replacement.

PDK-61 Assortment

¼-½-Watt Assortment

63 cards of the most commonly used values of ¼-watt and ½-watt resistors. This assortment was specifically designed for resistor replacement in the "Motrac" Radio, "Handie-Talkie," pocket transmitter and other miniaturized-type radio equipment.

PDK-62 Assortment

¼-Watt Resistor Assortment

69 cards of standard values of ¼ watt, 10% resistors from 10 ohms to 5.6 megohms.

PDK-63 Assortment

½-Watt Resistor Assortment

75 cards of standard values of ½ watt, 10% resistors from 10 ohms to 22 megohms.

PDK-64 Assortment

⅛-Watt Resistor Assortment

75 cards, 5 each of standard values of ⅛ watt 10% resistors from 10 ohms to 22 megohms.

PDK-65 Assortment

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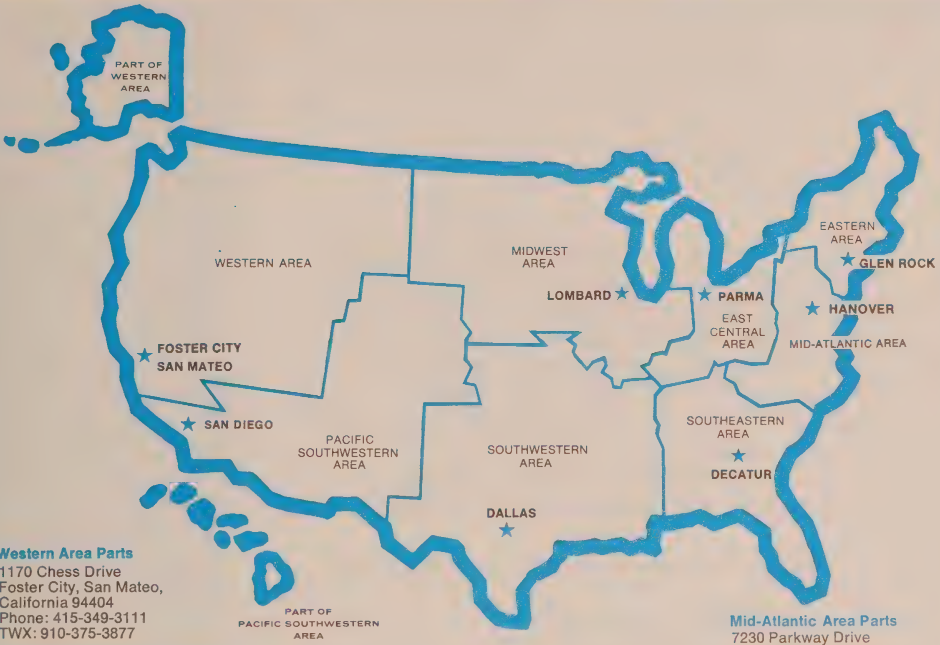
PART OF WESTERN AREA
WESTERN AREA
MIDWEST AREA
EASTERN AREA
GLEN ROCK
LOMBARD
PARMA
HANOVER
EAST CENTRAL AREA
MID-ATLANTIC AREA
FOSTER CITY SAN MATEO
SAN DIEGO
PACIFIC SOUTHWESTERN AREA
SOUTHWESTERN AREA
SOUTHEASTERN AREA
DECATUR
DALLAS
PART OF PACIFIC SOUTHWESTERN AREA

Western Area Parts
1170 Chess Drive
Foster City, San Mateo,
California 94404
Phone: 415-349-3111
TWX: 910-375-3877

Pacific Southwestern Area Parts
P.O. Box 85036
San Diego, CA 92138
Phone: 714-292-8224
TWX: 910-335-1634

Southeastern Area Parts
P.O. Box 368
Decatur, Georgia 30031
Street Address:
5096 Panola Industrial Blvd.
Decatur, Georgia 30032
Phone: 404-981-9800
TWX: 810-766-0876

Southwestern Area Parts
P.O. Box 34290
3320 Belt Line Road
Dallas, Texas 75234
Phone: 214-241-2151
TWX: 910-860-5505

Midwest Area Parts
10 W. North Avenue
Lombard, Illinois 60148
Phone: 312-620-3000
TWX: 910-693-1592

East Central Area Parts
12955 Snow Road
Parma, Ohio 44130
Phone: 216-267-2210
TWX: 810-421-8845

Eastern Area Parts
85 Harristown Road
Glen Rock, New Jersey 07452
Phone: 201-447-4000
TWX: 710-988-5602

Mid-Atlantic Area Parts
7230 Parkway Drive
Hanover, MD 21076
Phone: 301-796-8600
TWX: 710-862-1941

National Accounts
Parts Order Administration

Telephone, Airline and
Railroad Sales
Phone: 312-576-6512

Federal Government Sales
Phone: 312-576-6511

1313 E. Algonquin Road
Schaumburg, Illinois 60196
TWX: 910-693-1592

Ⓜ, Auto-Mute, Big Voice, Channel Scan, Command-O-Lert, Compa-Station, Consolette, Converta-Com, Dispatcher, Duo-Board, Extender, Fire-Fighter, Handie-Com, Handie-Micro-Talkie, Handi-Talkie, Hear, Mav-Pack, Mem-O-Lert, Maxar, MX300, Metro-Page, Metro-Pageboy, Micor, Micor Systems 90, Mocom, Modar, Motorola, Motrac, Motran, Pageboy, Pagecom, People Finder, Permacode, Permakay, Power Voice, Private-Line, Quik-Call, Quik-Call II, Sensicon, Sensitron, T-Power, Triton, Telememory, Twin-V, Vibrasender, Vibrasponder are trademarks of Motorola, Inc. Bellboy is a trademark of American Tel. & Tel. Company.

Test Equipment Calibration and Repair

Motorola maintains facilities for the calibration and repair of test equipment. Please contact your designated Area Parts Office (see inside back cover) for return authorization and shipping instructions.

When shipping, please enclose the information indicated below and package equipment carefully to avoid damage. Damage claims for improper packaging will not be honored by the carrier.

1. Complete model number and description of equipment including cables and other accessory items.
2. Complete description of service desired, i.e. calibration or repair. Indicate the trouble with the unit to the best of your knowledge.
3. Shipping and invoicing addresses and purchase order number where applicable.
4. Special shipping considerations if any.
5. Date of purchase and Motorola order number if equipment is within warranty.

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  A complete line custom designed for two-way radios
- **Base and Mobile Service Aids** 54
  Test sets and panels to streamline servicing
- **Personal Portable FM Radio Service Aids** 66
  A wide variety of service aids for personal FM radios
- **MAV-PACK Training Programs** 84
  Complete audio-visual courses for efficient technician training
- **Mobile and Base Station Accessories** 92
  System designed for maximum communications efficiency
- **Mobile and Base Station Antennas** 132
  All types for any vehicle or any base radiation pattern
- **Personal Portable FM Radio Accessories** 152
  A comprehensive line to make the man on foot more versatile
- **Shop Supplies and Service Tools** 178
  A complete selection to meet any service requirement
- **Replacement Parts** 196
  The highest quality for maximum dependability

The Motorola Communications Group Parts Department . . . Your Central Source for Two-Way Radio Test Equipment, Accessories and Parts.

Motorola: Where You Get the Right Products . . .

TEST EQUIPMENT custom designed for two-way radio. Knowing that dependable test equipment is the lifeblood of the radio communications technician, Motorola provides an instrument for virtually any maintenance situation. Unique features of Motorola instruments, resulting from specialized design for two-way radio servicing, include portability, battery operation, high reliability, extreme ruggedness, and laboratory sophistication at low cost.

ACCESSORIES are an important aspect of the Motorola Parts Department. Should you decide to modify or upgrade your system, Motorola can supply the components you need.

EXTENSIVE INVENTORIES are maintained to provide off-the-shelf delivery of over 30,000 different parts. Everything from common electronic components, such as resistors and capacitors, to unique coils, controls, and mounting hardware. Entire printed circuit boards and kits are available for fast efficient servicing. Records are maintained on an additional 40,000-plus items which may be obtained on an as-required basis.

And The Proper Service!

SOS—SPECIAL ORDER SERVICE—provides emergency service 24 hours a day to guarantee the fastest possible delivery of critical components. During working hours, you can get immediate action by telephoning your designated Motorola office. For after-hours or for international orders, phone or cable Motorola Parts Headquarters in Schaumburg, Illinois. Specify the nature of your emergency and the parts required. Motorola will take over from there to provide lightning fast action.

PERSONALIZED SERVICE is readily available through various international offices throughout the world as well as strategically located Parts Department Sales Offices in the United States. Trained consultants are always available for assistance in identifying needed parts and solving difficult service problems.

COMPUTERS CONTROL all details of Motorola's parts distribution center in Lombard, Illinois. Mountains of data regarding customer orders, inventory status and location, and customer addresses and shipping routes are stored on magnetic disc and tape files. Special cathode ray tube display units, strategically located in the center and all U.S. field offices, provide instant access to these files for the ultimate in customer service.

The Motorola Parts Organization is a vital element in maintaining Motorola's world wide reputation as a leader in two-way radio communications. This international organization is dedicated to supporting both the radio user and the service technician . . . dedicated to helping you maintain your system at peak operating efficiency by supplying a complete line of two-way radio test equipment, service aids and accessories, as well as replacement parts.

When communications are vital, you can depend on genuine Motorola replacement parts and test equipment.

SHIPPING INFORMATION AND CREDIT APPLICATIONS

Shipping

Unless otherwise specified, merchandise listed in this catalog and stocked at our warehouse is sold "F.O.B. shipping point". The shipping point for the western sales area (including Alaska), and the Pacific southwestern sales area (including Hawaii) is the responsible Motorola Parts Office. Schaumburg, Ill. is the shipping point for all other areas. Drop ship items are F.O.B. point of origin. Shipping charges will be added to your invoice, unless otherwise specified. In some instances shipments will be C.O.D.

Except for emergency shipments routed by air *at your request,* all shipments will be routed in the most economical manner available, that is, via Parcel Post or United Parcel Service up to the maximum weight and size limits, otherwise via motor truck.

C.O.D. and Cash orders

If you have not established credit or do not have an open account with Motorola your order will be sent C.O.D. or on a "cash with order" basis only. On cash orders, please estimate shipping charges (approximately $5.00 for up to 30 lbs. parcel post or up to 100 lbs. United Parcel Service). Any excess will be promptly refunded.

Credit Applications

A $100 minimum order *is required* to establish credit. A handy credit application form is attached for your convenience.

UNITED PARCEL SERVICE AND PARCEL POST SHIPPING AND RATE TABLE

Orders 16 ounces or more are shipped via United Parcel Service, Parcel Post or truck. Any orders which weigh less than 16 ounces are shipped via third class mail or United Parcel Service.

United Parcel Service rates and postage on fourth-class matter (Parcel Post) are based on the zones indicated in the accompanying map.

United Parcel Service shipments are automatically insured up to $100.00 and require proof of delivery allowing shipments to be traced.

Third-Class Mail

Single piece rates. The rates do not follow a formula. See table.

0 to 2 ozs.	13¢	Over 8 to 10 ozs.	56¢
Over 2 to 4 ozs.	24¢	Over 10 to 12 ozs.	66¢
Over 4 to 6 ozs.	34¢	Over 12 to 14 ozs.	77¢
Over 6 to 8 ozs.	45¢	Over 14 to 15.99 ozs.	88¢

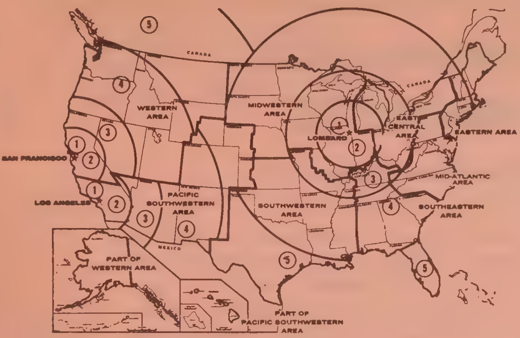
PARCEL POST RATES

(see map on facing page)

WEIGHT 1 POUND AND NOT EXCEEDING	ZONES				
	LOCAL	1 & 2	3	4	5
2	$0.77	$0.90	$0.93	$1.04	$1.15
3	.82	.97	1.02	1.15	1.29
4	.86	1.04	1.10	1.25	1.42
5	.91	1.11	1.19	1.36	1.56
6	.95	1.18	1.27	1.46	1.69
7	1.00	1.25	1.36	1.57	1.83
8	1.04	1.32	1.44	1.67	1.96
9	1.09	1.39	1.53	1.78	2.10
10	1.13	1.46	1.61	1.88	2.23
11	1.18	1.53	1.70	1.99	2.37
12	1.22	1.60	1.78	2.09	2.50
13	1.27	1.67	1.87	2.20	2.64
14	1.31	1.74	1.95	2.30	2.77
15	1.36	1.81	2.04	2.41	2.91
16	1.40	1.88	2.12	2.51	3.04
17	1.45	1.95	2.21	2.62	3.18
18	1.49	2.02	2.29	2.72	3.31
19	1.54	2.09	2.38	2.83	3.45
20	1.58	2.16	2.46	2.93	3.58
21	1.63	2.23	2.55	3.04	3.72
22	1.67	2.30	2.63	3.14	3.85
23	1.72	2.37	2.72	3.25	3.99
24	1.76	2.44	2.80	3.35	4.12
25	1.81	2.51	2.89	3.46	4.26
26	1.85	2.58	2.97	3.56	4.39
27	1.90	2.65	3.06	3.67	4.53
28	1.94	2.72	3.14	3.77	4.66
29	1.99	2.79	3.23	3.88	4.80
30	2.03	2.86	3.31	3.98	4.93
31	2.08	2.93	3.40	4.09	5.07
32	2.12	3.00	3.48	4.19	5.20
33	2.17	3.07	3.57	4.30	5.34
34	2.21	3.14	3.65	4.40	5.47
35	2.26	3.21	3.74	4.51	5.61
36	2.30	3.28	3.82	4.61	5.74
37	2.35	3.35	3.91	4.72	5.88
38	2.39	3.42	3.99	4.82	6.01
39	2.44	3.49	4.08	4.93	6.15
40	2.48	3.56	4.16	5.03	6.28
41	2.53	3.63	4.25	5.14	6.42
42	2.57	3.70	4.33	5.24	6.55
43	2.62	3.77	4.42	5.35	6.69
44	2.66	3.84	4.50	5.45	6.82
45	2.71	3.91	4.59	5.56	6.96
46	2.75	3.98	4.67	5.66	7.09
47	2.80	4.05	4.76	5.77	7.23
48	2.84	4.12	4.84	5.87	7.36
49	2.89	4.19	4.93	5.98	7.50
50	2.93	4.26	5.01	6.08	7.63
51	2.98	4.33	5.10	6.19	7.77
52	3.02	4.40	5.18	6.29	7.90
53	3.07	4.47	5.27	6.40	8.04
54	3.11	4.54	5.35	6.50	8.17
55	3.16	4.61	5.44	6.61	8.31
56	3.20	4.68	5.52	6.71	8.44
57	3.25	4.75	5.61	6.82	8.58
58	3.29	4.82	5.69	6.92	8.71
59	3.34	4.89	5.78	7.03	8.85
60	3.38	4.96	5.86	7.13	8.98
61	3.43	5.03	5.95	7.24	9.12
62	3.47	5.10	6.03	7.34	9.25
63	3.52	5.17	6.12	7.45	9.39
64	3.56	5.24	6.20	7.55	9.52
65	3.61	5.31	6.29	7.66	9.66
66	3.65	5.38	6.37	7.76	9.79
67	3.70	5.45	6.46	7.87	9.93
68	3.74	5.52	6.54	7.97	10.06
69	3.79	5.59	6.63	8.08	10.20
70	3.83	5.65	6.71	8.18	10.33

Exceptions: Parcel's weighing less than 15 pounds, and measuring over 84 inches but not exceeding 100 inches in length and girth combined, are chargeable with a minimum rate equal to that for a 15 pound parcel for the zone to which addressed. See Postal Service Manual section 135.3 for size and weight restrictions.

Effective May 1, 1976



(Parcel Post & UPS Zones)

United Parcel Service

Effective January 4, 1976

CALIFORNIA INTRASTATE RATE CHART

The following rates apply for deliveries between points in California.
DO NOT use this chart for deliveries to other states.

Any Fraction Of A Pound Over The Weight Shown Takes The Next Higher Rate

Weight Not To Exceed	Rates To Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Weight Not To Exceed	Rates To Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
1 lb.	$ .65	$ .66	$ .67	$ .69	$1.71	**26 lb.**	1.90	2.03	2.42	2.94	3.46
2 "	.70	.71	.74	.78	.82	**27 "**	1.95	2.09	2.49	3.03	3.57
3 "	.75	.77	.81	.87	.93	**28 "**	2.00	2.14	2.56	3.12	3.68
4 "	.80	.82	.88	.96	1.04	**29 "**	2.05	2.20	2.63	3.21	3.79
5 "	.85	.88	.95	1.05	1.15	**30 "**	2.10	2.25	2.70	3.30	3.90
6 "	.90	.93	1.02	1.14	1.26	**31 "**	2.15	2.31	2.77	3.39	4.01
7 "	.95	.99	1.09	1.23	1.37	**32 "**	2.20	2.36	2.84	3.48	4.12
8 "	1.00	1.04	1.16	1.32	1.48	**33 "**	2.25	2.42	2.91	3.57	4.23
9 "	1.05	1.10	1.23	1.41	1.59	**34 "**	2.30	2.47	2.98	3.66	4.34
10 "	1.10	1.15	1.30	1.50	1.70	**35 "**	2.35	2.53	3.05	3.75	4.45
11 "	1.15	1.21	1.37	1.59	1.81	**36 "**	2.40	2.58	3.12	3.84	4.56
12 "	1.20	1.26	1.44	1.68	1.92	**37 "**	2.45	2.64	3.19	3.93	4.67
13 "	1.25	1.32	1.51	1.77	2.03	**38 "**	2.50	2.69	3.26	4.02	4.78
14 "	1.30	1.37	1.58	1.86	2.14	**39 "**	2.55	2.75	3.33	4.11	4.89
15 "	1.35	1.43	1.65	1.95	2.25	**40 "**	2.60	2.80	3.40	4.20	5.00
16 "	1.40	1.48	1.72	2.04	2.36	**41 "**	2.65	2.86	3.47	4.29	5.11
17 "	1.45	1.54	1.79	2.13	2.47	**42 "**	2.70	2.91	3.54	4.38	5.22
18 "	1.50	1.59	1.86	2.22	2.58	**43 "**	2.75	2.97	3.61	4.47	5.33
19 "	1.55	1.65	1.93	2.31	2.69	**44 "**	2.80	3.02	3.68	4.56	5.44
20 "	1.60	1.70	2.00	2.40	2.80	**45 "**	2.85	3.08	3.75	4.65	5.55
21 "	1.65	1.76	2.07	2.49	2.91	**46 "**	2.90	3.13	3.82	4.74	5.66
22 "	1.70	1.81	2.14	2.58	3.02	**47 "**	2.95	3.19	3.89	4.83	5.77
23 "	1.75	1.87	2.21	2.67	3.13	**48 "**	3.00	3.24	3.96	4.92	5.88
24 "	1.80	1.92	2.28	2.76	3.24	**49 "**	3.05	3.30	4.03	5.01	5.99
25 "	1.85	1.98	2.35	2.85	3.35	**50 "**	3.10	3.35	4.10	5.10	6.10

ADDITIONAL CHARGES:

For each COD received for collection, 85 cents.
For each Address Correction, 85 cents.
For each Acknowledgement of Delivery (AOD), 20 cents.
For each package with a declared value over $100, 25 cents for each additional $100 or fraction thereof.

COMMON CARRIER RATE CHART

For deliveries to states other than California and Illinois.

Any Fraction Of A Pound Over The Weight Shown Takes The Next Higher Rate

Weight Not To Exceed	Rates To Zone 2	Zone 3	Zone 4	Zone 5	Weight Not To Exceed	Rates To Zone 2	Zone 3	Zone 4	Zone 5
1 lb.	$ .69	$ .70	$ .73	$ .75	**26 lb.**	$2.24	$2.63	$3.30	$3.98
2 "	.75	.78	.83	.88	**27 "**	2.30	2.70	3.41	4.11
3 "	.81	.86	.93	1.01	**28 "**	2.36	2.78	3.51	4.24
4 "	.87	.93	1.04	1.14	**29 "**	2.42	2.86	3.61	4.37
5 "	.93	1.01	1.14	1.27	**30 "**	2.48	2.93	3.71	4.49
6 "	1.00	1.09	1.24	1.40	**31 "**	2.55	3.01	3.82	4.62
7 "	1.06	1.16	1.35	1.53	**32 "**	2.61	3.09	3.92	4.75
8 "	1.12	1.24	1.45	1.66	**33 "**	2.67	3.17	4.02	4.88
9 "	1.18	1.32	1.55	1.79	**34 "**	2.73	3.24	4.13	5.01
10 "	1.24	1.39	1.65	1.91	**35 "**	2.79	3.32	4.23	5.14
11 "	1.31	1.47	1.76	2.04	**36 "**	2.86	3.40	4.33	5.27
12 "	1.37	1.55	1.86	2.17	**37 "**	2.92	3.47	4.44	5.40
13 "	1.43	1.63	1.96	2.30	**38 "**	2.98	3.55	4.54	5.53
14 "	1.49	1.70	2.07	2.43	**39 "**	3.04	3.63	4.64	5.66
15 "	1.55	1.78	2.17	2.56	**40 "**	3.10	3.70	4.74	5.78
16 "	1.62	1.86	2.27	2.69	**41 "**	3.17	3.78	4.85	5.91
17 "	1.68	1.93	2.38	2.82	**42 "**	3.23	3.86	4.95	6.04
18 "	1.74	2.01	2.48	2.95	**43 "**	3.29	3.94	5.05	6.17
19 "	1.80	2.09	2.58	3.08	**44 "**	3.35	4.01	5.16	6.30
20 "	1.86	2.16	2.68	3.20	**45 "**	3.41	4.09	5.26	6.43
21 "	1.93	2.24	2.79	3.33	**46 "**	3.48	4.17	5.36	6.56
22 "	1.99	2.32	2.89	3.46	**47 "**	3.54	4.24	5.47	6.69
23 "	2.05	2.40	2.99	3.59	**48 "**	3.60	4.32	5.57	6.82
24 "	2.11	2.47	3.10	3.72	**49 "**	3.66	4.40	5.67	6.95
25 "	2.17	2.55	3.20	3.85	**50 "**	3.72	4.47	5.77	7.07

ILLINOIS INTRASTATE RATE CHART

To Points Within The Same State
Do Not Use this Chart for Deliveries to Other States.

Weight Not To Exceed	Rates To Zone 2	Zone 3	Zone 4	Zone 5	Weight Not To Exceed	Rates To Zone 2	Zone 3	Zone 4	Zone 5
1 lb.	$ .70	$ .71	$ .74	$ .77	**26 lb.**	$2.27	$2.69	$3.39	$4.07
2 "	.76	.79	.85	.90	**27 "**	2.34	2.77	3.50	4.20
3 "	.82	.87	.95	1.03	**28 "**	2.40	2.85	3.60	4.33
4 "	.89	.95	1.06	1.16	**29 "**	2.46	2.93	3.71	4.46
5 "	.95	1.03	1.16	1.29	**30 "**	2.52	3.00	3.81	4.59
6 "	1.01	1.11	1.27	1.43	**31 "**	2.59	3.08	3.92	4.73
7 "	1.08	1.19	1.38	1.56	**32 "**	2.65	3.16	4.03	4.86
8 "	1.14	1.27	1.48	1.69	**33 "**	2.71	3.24	4.13	4.99
9 "	1.20	1.35	1.59	1.82	**34 "**	2.78	3.32	4.24	5.12
10 "	1.26	1.42	1.69	1.95	**35 "**	2.84	3.40	4.34	5.25
11 "	1.33	1.50	1.80	2.09	**36 "**	2.90	3.48	4.45	5.39
12 "	1.39	1.58	1.91	2.22	**37 "**	2.97	3.56	4.56	5.52
13 "	1.45	1.66	2.01	2.35	**38 "**	3.03	3.64	4.66	5.65
14 "	1.52	1.74	2.12	2.48	**39 "**	3.09	3.72	4.77	5.78
15 "	1.58	1.82	2.22	2.61	**40 "**	3.15	3.79	4.87	5.91
16 "	1.64	1.90	2.33	2.75	**41 "**	3.22	3.87	4.98	6.05
17 "	1.71	1.98	2.44	2.88	**42 "**	3.28	3.95	5.09	6.18
18 "	1.77	2.06	2.54	3.01	**43 "**	3.34	4.03	5.19	6.31
19 "	1.83	2.14	2.65	3.14	**44 "**	3.41	4.11	5.30	6.44
20 "	1.89	2.21	2.75	3.27	**45 "**	3.47	4.19	5.40	6.57
21 "	1.96	2.29	2.86	3.41	**46 "**	3.53	4.27	5.51	6.71
22 "	2.02	2.37	2.97	3.54	**47 "**	3.60	4.35	5.62	6.84
23 "	2.08	2.45	3.07	3.67	**48 "**	3.66	4.43	5.72	6.97
24 "	2.15	2.53	3.18	3.80	**49 "**	3.72	4.51	5.83	7.10
25 "	2.21	2.61	3.28	3.93	**50 "**	3.78	4.58	5.93	7.23

WEIGHT AND SIZE LIMITS:

Maximum Weight per package, 50 POUNDS.
Maximum Weight of all packages from one shipper to one consignee in one day, 100 pounds.
Maximum Size per package, 108 INCHES IN LENGTH AND GIRTH COMBINED.
Minimum charge for a package measuring over 84 inches in length and girth combined will be equal to charge for a package weighing 25 pounds.

SHIPPING INFORMATION AND AVERAGE RATES

MOTOR CARRIER SHIPMENTS: When the weight or size of a shipment is such that United Parcel Service or Parcel Post cannot be used, it will be shipped by truck. Generally, motor carriers are 100% liable for loss or damage in transit.

Truck charges vary depending upon the product shipped, the distance hauled and total weight. The greater the distance and/or the weight — the greater will be the total charge.

Truck shipments are subject to a "minimum charge per shipment" of from $14.00 to $20.00 from Chicago or more depending upon your location. Total charges are arrived at by multiplying the applicable freight rate per 100 pounds (cwt.) by the actual weight of the shipment; if this produces a lower cost than the "minimum charge", the minimum charge will be assessed. Because of the many factors which affect truck rates, actual costs cannot be quoted.

EMERGENCY SHIPMENTS VIA AIR TRANSPORTATION: When time is of the essence and you request that your shipment be routed via air, such shipments will again be routed in the most economical manner possible as follows — unless you specify otherwise:

1 — 10 lbs. — Air Parcel Post
Over 11 lbs. — Air Freight

Before deciding that this kind of premium cost transportation service is necessary, you will wish to bear in mind that the cost can be anywhere from 2-1/2 to 7 times greater than if shipped via the most economical means of surface transportation.

DECLARATION OF VALUE FOR TRANSIT INSURANCE PURPOSES: Under our "F.O.B. shipping point" term of sale, title to the shipment passes to our customer at the moment we tender it to the carrier at our shipping dock, and responsibility for filing claims for loss or damage in transit is yours. (UPS however, requires that actual claim be filed by the shipper. Therefore, please advise us immediately regarding damaged shipments so we may file a claim for you.) When placing your order we should also be advised whether or not we should declare value for insurance purposes in connection with all shipments moving via any mode of transportation *other than motor carrier*. Parcel Post is not liable for loss unless shipment is insured and all methods of air transportation limit their liability to 50c per pound or $50.00 per shipment unless full value is declared. However if you carry your own insurance for transit loss or damage, then we should be advised not to delcare value or take out insurance for this purpose.

We hope this information will help you help Motorola to keep your transportation costs to a minimum consistent with the kind of service you require.

ORDER BLANK

MOTOROLA INC.
Communications Group
PARTS DEPARTMENT
Please mail to appropriate area office

CUSTOMER ORDER NO.	P.O. DATE	PAGE NO.

SOLD TO (person filling out order blank)

BILL TO

SHIP TO

MATERIAL DESTINATION (Please fill in if material is to be trans shipped from ship to address.)

☐ Check here if you are applying for credit (see reverse side)

SHIP VIA:	F.O.B.	TERMS

SHADED AREA BELOW FOR MOTOROLA USE

CONTROL NO.

CUSTOMER NO.

SOLD-TO TAG	SHIP-TO TAG	BILL-TO TAG	ULT. DEST.	PRIORITY

TOTAL LINES	COMM.	SALESMAN NO.	STANDARD MESSAGES		

ACCOUNT NO.

CONS. CODE	CONTRACT NO.	SELL. ORG.

VIA	F.O.B.	TERMS	TAX	P/C	DESC.	A.D.T.

ACCTS. REC. CUSTOMER NO.	PACKING	VOUCHER

S.I.C.	REQ. PICK DATE	MAN 1%	MAN 2%	MAN 2#

ITEM NO.	QUANTITY	U/M	PART NUMBER	DESCRIPTION/COMMENTS	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Authorized Signature

Telephone Number

Use
Convenient
Order Form
on Other Side

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.

Please Mail To Your Local Motorola Parts Depot

CREDIT APPLICATION

$100 Minimum Order Required To Establish Credit

NAME

STREET ADDRESS

CITY, STATE, & ZIP CODE

TELEPHONE NUMBER

If this is a business firm:

Type of Business ☐ Corp. ☐ Partnership ☐ Proprietorship

Date business started________________
Month—Year.

If this is an individual: Age__________ Social Security Number________________

Employer

Address

No. of years employed

Monthly Income

Bank Reference

Address

☐ Checking
☐ Loan

Trade Reference

Address

Account #

Trade Reference

Address

Account #

Estimated Monthly Parts Requirements $________________

CREDIT TERMS ARE NET 10 DAYS ITEMS AS SHIPPED

Title

Authorized Signature

Date

MOTOROLA INC.
Communications Group
PARTS DEPARTMENT
Please mail to appropriate area office

ORDER BLANK

CUSTOMER ORDER NO.	P.O. DATE	PAGE NO.

SOLD TO (person filling out order blank)

BILL TO

SHIP TO

MATERIAL DESTINATION (Please fill in if material is to be trans shipped from ship to address.)

☐ Check here if you are applying for credit (see reverse side)

SHIP VIA:	F.O.B.	TERMS

SHADED AREA BELOW FOR MOTOROLA USE

CONTROL NO.

CUSTOMER NO.

SOLD-TO TAG	SHIP-TO TAG	BILL-TO TAG	ULT. DEST.	PRIORITY
TOTAL LINES	COMM.	SALESMAN NO.	STANDARD MESSAGES	

ACCOUNT NO.

CONS. CODE	CONTRACT NO.	SELL. ORG.

VIA	F.O.B.	TERMS	TAX	P/C	DESC.	A D.T.

ACCTS. REC. CUSTOMER NO.	PACKING	VOUCHER

S.I C.	REQ. PICK DATE	MAN 1%	MAN 2%	MAN 2#

ITEM NO.	QUANTITY	U/M	PART NUMBER	DESCRIPTION/COMMENTS	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Authorized Signature

Telephone Number

Use
Convenient
Order Form
on Other Side

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.

Please Mail To Your Local Motorola Parts Depot

CREDIT APPLICATION

$100 Minimum Order Required To Establish Credit

NAME ____________________

STREET ADDRESS ____________________

CITY, STATE, & ZIP CODE ____________________

TELEPHONE NUMBER ____________________

If this is a business firm:

Type of Business ☐ Corp. ☐ Partnership ☐ Proprietorship

Date business started ____________________ Month—Year.

If this is an individual: Age ________ Social Security Number ____________________

Employer ____________________

Address ____________________

No. of years employed ____________________

Monthly Income ____________________

- -

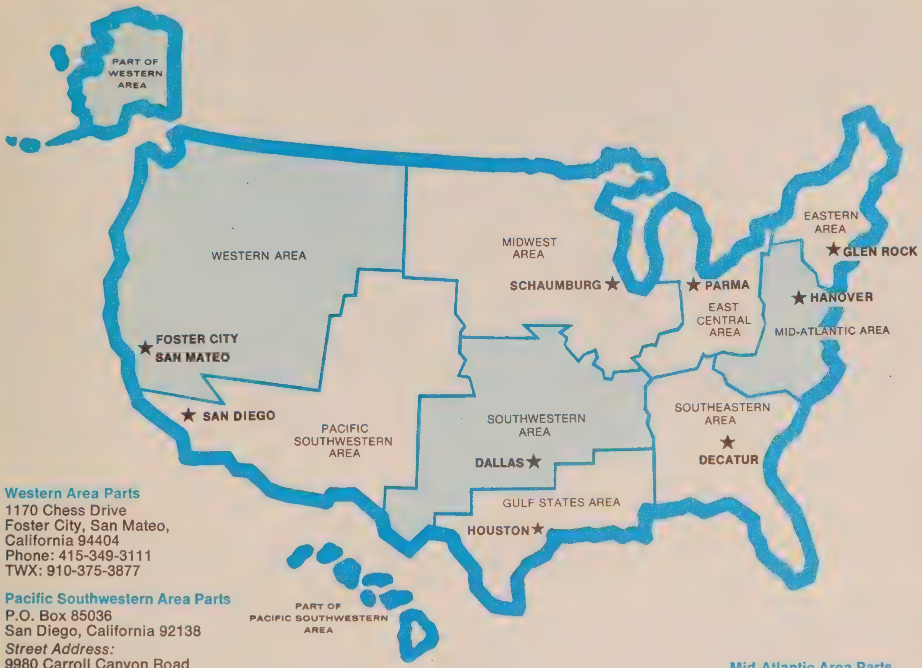
Bank Reference	Address	☐ Checking ☐ Loan
Trade Reference	Address	Account #
Trade Reference	Address	Account #

Estimated Monthly Parts Requirements $____________________

CREDIT TERMS ARE NET 10 DAYS ITEMS AS SHIPPED

Title ____________________ Authorized Signature ____________________ Date ____________________

Order from these Convenient Locations


PART OF WESTERN AREA
WESTERN AREA
MIDWEST AREA
EASTERN AREA
GLEN ROCK
SCHAUMBURG
PARMA
HANOVER
EAST CENTRAL AREA
MID-ATLANTIC AREA
FOSTER CITY SAN MATEO
SAN DIEGO
PACIFIC SOUTHWESTERN AREA
SOUTHWESTERN AREA
SOUTHEASTERN AREA
DALLAS
DECATUR
GULF STATES AREA
HOUSTON
PART OF PACIFIC SOUTHWESTERN AREA

Western Area Parts
1170 Chess Drive
Foster City, San Mateo,
California 94404
Phone: 415-349-3111
TWX: 910-375-3877

Pacific Southwestern Area Parts
P.O. Box 85036
San Diego, California 92138
Street Address:
9980 Carroll Canyon Road
San Diego, California 92131
Phone: 714-578-2222
TWX: 910-335-1634

Gulf States Area Parts
8550 Katy Freeway
Suite 128
Houston, Texas 77024
Phone: 713-932-8955

Southwestern Area Parts
P.O. Box 34290
3320 Belt Line Road
Dallas, Texas 75234
Phone: 214-241-2151
TWX: 910-860-5505

Midwest Area Parts
1313 E. Algonquin Rd.
Schaumburg, Illinois 60196
Phone: 312-576-7322
TWX: 910-693-0869

Southeastern Area Parts
P.O. Box 368
Decatur, Georgia 30031
Street Address:
5096 Panola Industrial Blvd.
Decatur, Georgia 30032
Phone: 404-981-9800
TWX: 810-766-0876

East Central Area Parts
12955 Snow Road
Parma, Ohio 44130
Phone: 216-267-2210
TWX: 810-421-8845

Eastern Area Parts
85 Harristown Road
Glen Rock, New Jersey 07452
Phone: 201-447-4000
TWX: 710-988-5602

Mid-Atlantic Area Parts
7230 Parkway Drive
Hanover, Maryland 21076
Phone: 301-796-8600
TWX: 710-862-1941

National Accounts
Parts Order Administration
Telephone, Airline, and
Railroad Sales
Phone: 312-576-6512
Federal Government Sales
Phone: 312-576-6511
1313 E. Algonquin Road
Schaumburg, Illinois 60196
TWX: 910-693-0869

SOS . . . Special Order Service

Fast, efficient personalized customer service is always the rule with Motorola. And we're at our best in an emergency with SOS . . . Special Order Service.

Special Order Service begins with you . . . ask for it when you need it. When an emergency strikes . . . a base station or key mobile is "off-the-air" . . . or your system is down . . . you need help immediately. During working hours, you can get immediate action by telephoning your designated Motorola Parts office.

After normal working hours and on weekends, phone the Motorola Parts Distribution Center in Schaumburg, Illinois. Specify the nature of your emergency and the parts required. Motorola will take over from there to provide fast personalized service.

After hours SOS phone number . . . (312) 576-5111

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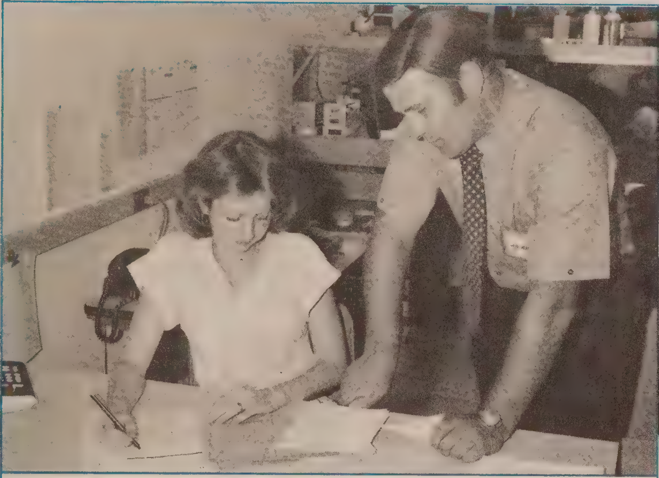
Motorola Test Equipment Calibration and Repair Center



Test Equipment Repair Center Manager, Dave Heaphy, checks scheduling on repairs.

Highly qualified instrument technicians (many of whom also have two-way radio experience) are specifically trained on individual units.

Technicians set master oscillator on R-1200 Service Monitor using rubidium beam frequency standard calibrated with WWV receiver.

The Motorola Test Equipment Repair Center is charged with the service responsibility for all test equipment supplied by the Motorola Communications Group. The center maintains a stock of original equipment replacement parts and a complete library of service information for all Motorola test equipment. Qualified instrument technicians (many of whom also have two-way radio experience) are specifically trained on various individual units. Extensive "in-house" resources include a rubidium beam frequency standard continuously calibrated to WWV and an environmental chamber for temperature cycling as well as spectrum analyzers, a storage oscilloscope, and other standard instrumentation.

Most in-warranty repairs are performed at the center. Exceptions include repairs on some equipment not manufactured by Motorola which are performed by the original supplier under the direction of the Test Equipment Repair Center. Out-of-warranty service is performed on a time and materials basis at competitive rates and the maximum turn-around goal is less than ten working days. Customer satisfaction is continually surveyed by reply cards returned with repaired instruments.

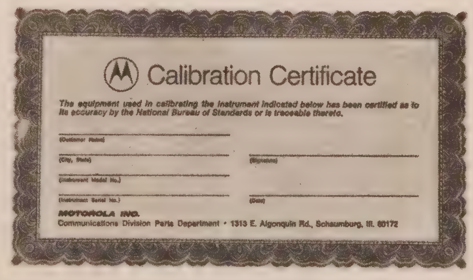
Frequency measurement is an essential element of two-way radio servicing and most frequency measuring instruments should be recalibrated at intervals of six months to one year depending on the aging characteristics of the master oscillator. The Motorola Test Equipment Calibration and Repair Center is fully prepared to provide this service and certify your instruments traceable to the U.S. National Bureau of Standards via WWV.

The Test Equipment Repair Center also provides a convenient telephone trouble shooting service. Frequently, a user technician can trouble shoot a piece of equipment and isolate defective components under the direction of the Test Equipment Repair Center via telephone.

Required replacement parts are then immediately shipped to the user thereby reducing shipping time and servicing costs. For telephone trouble shooting contact the Test Equipment Repair Center which can be reached on (312) 576-7025.

All other inquiries and requests for test equipment calibration and repairs should be directed to the Area Parts Office. They will contact the Test Equipment Repair Center, process the necessary paperwork and, if necessary, have the Center contact you to expedite the repair.

The extensive capabilities of the Test Equipment Repair Center represent another example of the in-depth back up support available when Motorola test equipment is purchased.



Calibration Certificate

The equipment used in calibrating the instrument indicated below has been certified as to its accuracy by the National Bureau of Standards or is traceable thereto.

(Customer Name)

(City, State)

(Signature)

(Instrument Model No.)

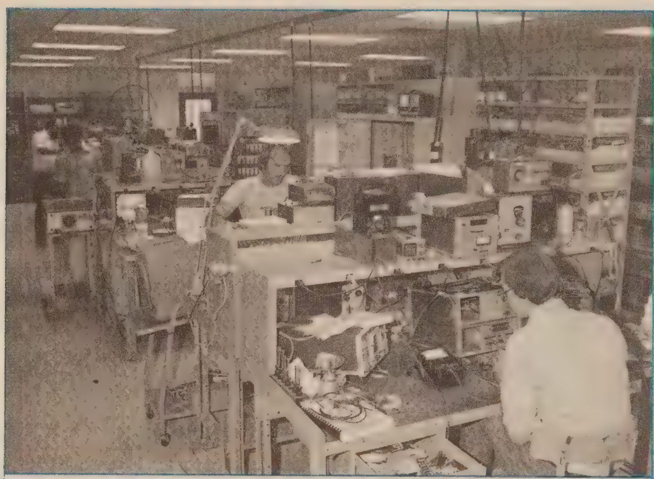
(Instrument Serial No.)

(Date)

MOTOROLA INC.
Communications Division Parts Department • 1313 E. Algonquin Rd., Schaumburg, Ill. 60172

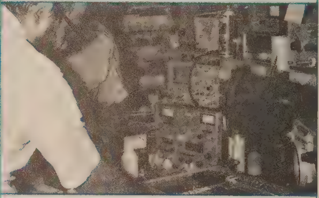
Frequency Measuring Instruments should be recalibrated at six months to one year intervals depending on aging characteristics of the master oscillator.

Motorola Test Equipment Calibration and Repair Center



One view of the Test Equipment Repair Center.

Technician cycles Service Monitor in temperature chamber when required before returning to customer.



It takes sophisticated instrumentation, as well as trained technicians, to service sophisticated instruments.

Test Equipment Calibration and Repair Shipping Procedures

Please contact your designated Area Parts Office for return procedures and shipping instructions. When shipping, please enclose the information indicated below and package equipment carefully to avoid damage. Damage claims which result from improper packaging will not be honored by the carrier.

1) Complete model number and description of equipment including cables and other accessory items.
2) Complete description of service desired, i.e. calibration or repair. Indicate the trouble with the unit to the best of your knowledge.
3) Shipping and invoicing addresses and purchase order number where applicable.
4) Special shipping considerations if any.
5) Date of purchase and Motorola order number if equipment is within warranty.

Part No.	Description	User Price	NSO Price	Part No.	Description	User Price	NSO Price	Part No.	Description	User Price	NSO Price
B-1203C	PHONE PATCH	464.00/EA.	325.00	HLN-4188A	HANG-UP BOX	25.75/EA.	19.25	NKN-6110A	CABLE KIT	10.25/EA.	7.70
B-1233A	DRAWER	108.00/EA.	81.00	HLN-4208A	TRUNNION	5.15/EA.	3.85	NKN-6111A	CABLE KIT	10.25/EA.	7.70
B-1251A	PANEL	160.00/EA.	112.00	HMN-4000B	MICROPHONE KIT	61.75/EA.	43.25	NKN-6112A	CABLE KIT	19.50/EA.	13.75
BDN-6041A	MOUNTING KIT	78.25/EA.	58.75	HMN-4001B	MICROPHONE KIT	56.75/EA.	39.75	NKN-6150A	CABLE KIT	10.25/EA.	7.70
BDN-6042A	MOUNTING KIT	91.75/EA.	68.75	HMN-4002A	MICROPHONE, KYNAMIC	56.75/EA.	39.75	NKN-6151A	CABLE KIT	12.25/EA.	12.25
BDN-6043A	MOUNTING KIT	74.25/EA.	55.75	HSN-4000A	SPEAKER	41.25/EA.	29.00	NKN-6192A	CABLE KIT	28.75/EA.	21.50
BDN-6044A	MOUNTING KIT	87.50/EA.	65.75	HSN-4002A	SPEAKER	31.00/EA.	23.25	NKN-6197A	CABLE KIT	21.75/EA.	15.25
BDN-6045A	SPEAKER-MICROPHONE	84.50/EA.	63.50	HSN-4005A	SPEAKER	36.00/EA.	27.00	NKN-6207A	CABLE KIT	34.00/EA.	25.50
BDN-6056A	HANDSET ASSEMBLY	160.00/EA.	120.00	HSN-4006A	SPEAKER	36.00/EA.	27.00	NKN-6212C	CABLE KIT	87.50/EA.	65.50
BDN-6077A	DRAWER	339.00/EA.	254.00	HSN-4011A	SPEAKER	46.25/EA.	34.75	NKN-6214B	CABLE KIT	87.50/EA.	61.25
BDN-6086A	HANDSET	206.00/EA.	155.00	MA-390AB	MODULE	2081.00/EA.	1457.00	NKN-6223A	ANT CABLE KIT	32.00/EA.	24.00
BKN-6039A	CABLE KIT	77.25/EA.	61.75	MBTKN-8158A	CABLE KIT	10.25/EA.	10.25	NKN-6232A	CABLE	113.00/EA.	79.00
BLN-1036A	PANEL	191.00/EA.	134.00	MCN-6001A	LOGIC BOARD	299.00/EA.	209.00	NKN-6238A	BATTERY CABLE KIT	81.25/EA.	57.00
BLN-6200A	STP AC UTILITY	61.75/EA.	43.25	MDG-6071A	BASE ANT ACCESSORIES	3414.00/EA.	2731.20	NKN-6239A	CHARGER CABLE	81.25/EA.	57.00
BLN-6380A	MOUNTING KIT	247.00/EA.	210.00	MDG-6082A	BASE ANT ACCESSORIES	7498.00/EA.	5998.40	NKN-6240A	CHARGER CABLE	81.25/EA.	57.00
BMN-6004A	MICROPHONE	148.00/EA.	104.00	MDG-6091A	BASE ANT ACCESSORIES	17067.00/EA.	13653.60	NKN-6244A	CABLE	91.75/EA.	64.25
CKN-6025A	CABLE KIT	10.25/EA.	10.25	MDG-6300A	REPLACEMENT KIT	288.00/EA.	230.40	NKN-6247A	CABLE	12.00/EA.	8.40
CLN-6227A	MOUNTING KIT	22.75/EA.	16.00	MDG-6461A	BASE ANT ACCESSORIES	1303.00/EA.	1042.40	NKN-6248A	CABLE KIT	32.00/EA.	24.00
CPN-1012A	POWER PACK	425.00/EA.	425.00	MDG-6511A	BASE ANT ACCESSORIES	2070.00/EA.	1656.00	NKN-6260A	ANT CABLE KIT	8.25/EA.	6.20
GMN-6000A	MICROPHONE	65.00/EA.	45.50	MDG-6561A	BASE ANT ACCESSORIES	2956.00/EA.	2364.80	NKN-6300A	CABLE	27.75/EA.	20.75
GPN-6101A	POWER SUPPLY	264.00/EA.	198.00	MDN-6001A	MOUNTING KIT	314.00/EA.	283.00	NLC-6001B	MODULE	102.85/EA.	72.00
GWN-1019A	MOUNTING KIT	140.00/EA.	98.00	MDN-6004A	MOUNTING KIT	443.00/EA.	354.00	NLC-6002B	VOLT CONT OSC/VCO	102.85/EA.	72.00
HCN-1001A	CONTROL HEAD	108.00/EA.	75.50	MDN-6041A	ANTENNA	1695.00/EA.	1356.00	NLC-6011A	MODULE	79.25/EA.	55.50
HCN-1004A	CONTROL HEAD	72.00/EA.	50.50	MDN-6042A	RADOME	2462.00/EA.	1969.60	NLC-6012A	MODULE	79.25/EA.	55.50
HCN-1005A	CONTROL HEAD	87.50/EA.	61 25	MDN-6660A	BATTERY	611.00/EA.	534.00	NLC-6021A	MODULE	68.60/EA.	48.00
HCN-1007A	CONTROL HEAD	97.75/EA.	68.50	MDN-6662A	BATTERY	665.00/EA.	624.00	NLC-6022A	MODULE	68.60/EA.	48.00
HCN-1009A	CONTROL HEAD	92.75/EA.	65.00	MDN-6665A	BATTERY	1249.00/EA.	866.00	NLC-6031A	MODULE	76.10/EA.	53.25
HCN-1011A	CONTROL HEAD	103.00/EA.	72.00	MDN-6728A	INSTALLATION KIT	61.75/EA.	46.25	NLC-6032A	MODULE	76.10/EA.	53.25
HCN-1018A	CONTROL HEAD	108.00/EA.	75.50	MFA-1000A	RECEIVER FILTER	505.00/EA.	354.00	NLC-6041A	MODULE	87.85/EA.	61.50
HCN-4000A	CONTROL HEAD	82.50/EA.	57.75	MFN-6017A	FILTER	196.00/EA.	137.00	NLC-6042A	MODULE	87.85/EA.	61.50
HCN-4001A	CONTROL HEAD	92.75/EA.	65.00	MGN-6006A	PANEL	72.00/EA.	50.50	NLC-6050B	MODULE	67.50/EA.	47.25
HCN-4002A	CONTROL HEAD	87.50/EA.	61.25	MKN-6075A	CABLE	46.25/EA.	34.75	NLD-6561A	MODULE	42.85/EA.	30.00
HCN-4003A	CONTROL HEAD	97.75/EA.	68.50	MLN-1023A	TEST EQUIPMENT	386.00/EA.	270.00	NLD-6562A	MODULE	42.85/EA.	30.00
HCN-4005A	CONTROL HEAD	134.00/EA.	93.75	MLN-1029A	MODULE	731.00/EA.	512.00	NLD-6571A	MODULE	87.85/EA.	61.50
HCN-4007A	CONTROL HEAD	134.00/EA.	93.75	MLN-1042A	TEST EQUIPMENT	355.00/EA.	249.00	NLD-6572A	MODULE	87.85/EA.	61.50
HCN-4008A	CONTROL HEAD	72.00/EA.	50.50	MLN-6078A	CABLE	97.75/EA.	68.50	NLD-6573A	MODULE	87.85/EA.	61.50
HCN-4009A	CONTROL HEAD	82.50/EA.	57.75	MLN-6086A	EXTENDER BOARD	144.00/EA.	101.00	NLD-6592A	MODULE	67.50/EA.	47.25
HCN-4010A	CONTORL HEAD	77.25/EA.	54.00	MLN-6158A	TERMINATION CARD	417.00/EA.	292.00	NLD-6601A	MODULE	75.00/EA.	52.50
HCN-4011A	CONTROL HEAD	87.50/EA.	61.25	MLN-6160A	TERMINATION CARD	237.00/EA.	166.00	NLD-6602B	MODULE	75.00/EA.	52.50
HCN-4024A	CONTROL HEAD	82.50/EA.	57.75	MLN-6161A	TERMINATION CARD	340.00/EA.	238.00	NLD-6603A	MODULE	75.00/EA.	52.50
HHN-4002A	HOUSING	41.25/EA.	29.00	MLN-6164A	ADAPTOR	41.25/EA.	29.00	NLD-6610A	MODULE	79.30/EA.	55.50
HHN-4003A	HOUSING	61.75/EA.	43.25	MLN-6167A	ADAPTOR, SIGNALING	232.00/EA.	162.00	NLD-6611A	MODULE	79.30/EA.	55.50
HKN-4000A	CABLE KIT	61.75/EA.	43.25	MLN-6168A	ADAPTOR	211.00/EA.	148.00	NLD-6612B	MODULE	84.05/EA.	58.85
HKN-4001A	CABLE KIT	61.75/EA.	43.25	MLN-6174A	ADAPTOR	61.75/EA.	43.25	NLD-6621A	MODULE	76.10/EA.	53.25
HKN-4002A	CONTROL HEAD W/CABLE	67.00/EA.	47.00	MLN-6178A	EXTENDER BOARD	211.00/EA.	148.00	NLD-6622A	MODULE	76.10/EA.	53.25
HKN-4004A	NEGATIVE GROUND CABLE	56.75/EA.	39.75	MLN-6256A	REGULATOR	196.00/EA.	137.00	NLD-6623A	MODULE	76.10/EA.	53.25
HKN-4006A	CONTROL HEAD W/CABLE	67.00/EA.	47.00	MLN-6298A	EXTENDER CARD	160.00/EA.	112.00	NLD-6631A	MODULE	68.60/EA.	48.00
HKN-4007A	CABLE KIT	5.15/EA.	3.85	MLN-6309A	CODE PLUG	20.50/EA.	12.80	NLD-6632B	MODULE	68.60/EA.	48.00
HKN-4008A	CONTROL CABLE	61.75/EA.	43.25	MPN-6013A	CONVERTER	391.00/EA.	274.00	NLD-6633B	POWER AMPLIFIER	68.60/EA.	48.00
HKN-4009A	CONTROL HEAD W/CABLE	67.00/EA.	47.00	MPN-6020A	CONVERTER	355.00/EA.	249.00	NLD-6641A	MODULE	86.80/EA.	60.75
HKN-4010A	CABLE	67.00/EA.	47.00	MRA-1000A	RECEIVER	505.00/EA.	354.00	NLD-6642A	MODULE	86.80/EA.	60.75
HKN-4012A	CABLE	56.75/EA.	39.75	MRB-1000A	AMPLIFIER	505.00/EA.	354.00	NLD-6643A	MODULE	86.80/EA.	60.75
HKN-4013A	CABLE	61.75/EA.	54.25	MRE-1010A	OSCILLATOR	515.00/EA.	361.00	NLD-6921A	MODULE	39.65/EA.	27.75
HKN-4015A	CABLE KIT	5.15/EA.	3.85	MRE-1020A	RECEIVER PANEL	633.00/EA.	443.00	NLE-6931A	MODULE	147.85/EA.	103.50
HKN-4016A	CABLE	61.75/EA.	43.25	MRG-6000A	PRE—AMPLIFIER KIT	572.00/EA.	400.00	NLE-6932A	MODULE	147.85/EA.	103.50
HKN-4017A	CABLE	61.75/EA.	43.25	MRG-6004A	OSCILLATOR	216.00/EA.	151.00	NLE-6933A	MODULE	147.85/EA.	103.50
HKN-4020A	CABLE	56.75/EA.	39.75	MRG-6005A	MIXER	221.00/EA.	155.00	NLE-8001A	MODULE	54.65/EA.	38.25
HKN-4022A	CABLE	67.00/EA.	47.00	MRG-6007A	RECEIVER	278.00/EA.	195.00	NLE-8002A	MODULE	54.65/EA.	38.25
HKN-4023A	CABLE	61.75/EA.	43.25	MRG-6008A	PRE-AMPLIFIER KIT	427.00/EA.	299.00	NLE-8003A	MODULE	54.65/EA.	38.25
HKN-4025A	CABLE	67.00/EA.	47.00	MRN-6003A	RECEIVER	530.00/EA.	371.00	NLE-8011A	MODULE	70.70/EA.	49.50
HKN-4027A	CABLE	56.75/EA.	39.75	MTG-6003B	OSCILLATOR	1035.00/EA.	725.00	NLE-8012A	MODULE	70.70 EA.	49.50
HKN-4028A	CABLE	61.75/EA.	43.25	MTN-6007A	LOGIC MODULE	618.00/EA.	433.00	NLE-8013A	MODULE	70.70 EA.	49 50
HKN-4030A	CABLE KIT	77.25/EA.	54.00	NAE-6050B	ANT UHF FLEXIBLE	8.50/EA.	4.25	NLE-8181A	MODULE	65.35/EA.	45.75
HKN-4031A	CABLE KIT	82.50/EA.	57.75	NDD-6000A	ANT GUTTER H/B UHF	10.00/EA.	7.00	NLE-8182A	MODULE	65.35/EA.	45.75
HKN-4032A	CABLE KIT	92.75/EA.	65.00	NFC-6011A	FILTER	37.50/EA.	26.25	NLE-8183A	MODULE	65.35 EA.	45.75
HKN-4033A	CABLE KIT	97.75/EA.	68.50	NFC-6012A	FILTER	37.50/EA.	26.25	NLE-8331A	MODULE	65.35/EA.	45.75
HKN-4034A	CABLE KIT	87.50/EA.	61.25	NFD-6011A	MODULE	37.50/EA.	26.25	NLE-8332A	MODULE	75.00/EA.	52.50
HKN-4039A	CABLE KIT	77.25/EA.	54.00	NFD-6012A	MODULE	37.50/EA.	26.25	NLE-8333A	MODULE	75.00/EA.	52.50
HKN-4041A	CABLE	15.50/EA.	11.50	NFD-6061A	MODULE	37.50/EA.	26.25	NLE-8342A	MODULE	78.20/EA.	54.75
HKN-4051A	CABLE KIT	10.25/EA.	7.70	NFD-6062A	FILTER	37.50/EA.	26.25	NLE-8351A	MODULE	123.20/EA.	86.25
HKN-4052A	CABLE	10.25/EA.	7.70	NFE-6041A	FILTER	39.65/EA.	27.75	NLE-8352A	MODULE	123.50/EA.	86.25
HLD-4051A	PRE-AMPLIFIER KIT	67.00/EA.	47.00	NFE-6042A	FILTER	39.65/EA.	27.75	NLE-8353A	MODULE	123.20/EA.	86.25
HLD-4052A	PRE-AMPLIFIER KIT	67.00/EA.	47.00	NFE-6052A	FILTER	39.65/EA.	27.75	NLF-4010A	MODULE	52.45 EA.	36.75
HLN-1000A	CONTROL	72.75/EA.	65.00	NFN-6009A	MODULE	47.15/EA.	33.00	NLF-4020A	MODULE	115.70/EA.	81.00
HLN-1001A	CONTROL	139.00/EA.	97.25	NFN-6011B	MODULE	51.45/EA.	36.00	NLF-4030A	MODULE	51.45/EA.	36.00
HLN-1002A	CHANNEL SCAN	221.00/EA.	155.00	NFN-6012B	I.C./MOS	129.65/EA.	90.75	NLF-4040A	MODULE	120.00/EA.	84.00
HLN-1003A	CHANNEL SCAN	221.00/EA.	155.00	NKD-6000B	ANT CABLE KIT	36.00/EA.	25.25	NLF-4050B	MODULE	17.15/EA.	12.00
HLN-1004A	MULTI PL ENCODER	134.00/EA.	93.75	NKD-6001B	ADAPTOR	31.00/EA.	21.75	NLF-4060A	MODULE	30.00/EA.	21.00
HLN-1005A	MULTI PL ENCODER	144.00/EA.	101.00	NKD-6006A	ADAPTOR	36.00/EA.	25.25	NLF-4071A	MODULE	64.30/EA.	45.00
HLN-1011A	PRIVATE LINE BOARD	196.00/EA.	137.00	NKE-6003A	ADAPTOR	31.00/EA.	21.75	NLF-4081A	MODULE	90.00/EA.	63.00
HLN-1014A	CHANNEL SCAN	221.00/EA.	155.00	NKE-6004A	ADAPTOR	36.00/EA.	25.25	NLF-4091A	MODULE	68.60/EA.	48.00
HLN-1021A	SWITCH	103.00/EA.	72.00	NKE-6008A	ADAPTOR	46.25/EA.	32.75	NLF-4101A	MODULE	86.80/EA.	60.75
HLN-1022A	VOICE PRIVACY ADAPTER	427.00/EA.	299.00	NKE-6009A	ADAPTOR	46.25/EA.	32.75	NLF-4111A	MODULE	46.10/EA.	32.35
HLN-1026A	SIREN	391.00/EA.	274.00	NKN-6075A	CABLE KIT	7.20/EA.	5.40	NLN-4031A	PRIVATE LINE BOARD	100.00/EA.	70.00
HLN-4012A	TIME-OUT TIMER BOARD	51.50/EA.	36.00	NKN-6076A	CABLE KIT	12.25/EA.	9.20	NLN-4036A	CHARGER, MX SINGLE	76.25/EA.	57.25
HLN-4022A	INSTALLATION KIT	5.15/EA.	3.85	NKN-6094A	CABLE KIT	8.25/EA.	5.80	NLN-4038A	CHARGER, MX SINGLE	146.00 EA.	110.00
HLN-4024A	MICROPHONE KIT	25.75/EA.	19.25	NKN-6095A	CABLE KIT	8.25/EA.	5.80	NLN-4052B	MODULE	72.85/EA.	51.00
HLN-4025A	MICROPHONE KIT	41.25/EA.	28.75	NKN-6104A	CABLE KIT	10.25/EA.	7.70	NLN-4118A	CASE, CARRYING	50.50/EA.	30.00
HLN-4034A	PLATE, MOUNTING	20.50/EA.	15.50	NKN-6105A	CABLE KIT	18.50/EA.	14.00	NLN-4119A	CASE, CARRYING	50.50/EA.	30.00
HLN-4111A	INSTALLATION KIT	5.15/EA.	3.85	NKN-6109A	CABLE KIT	13.50/EA.	9.45	NLN-4121A	CASE, CARRYING	50.50/EA.	30.00

Part No.	Description	User Price	NSO Price
NLN-4122A	CASE, CARRYING	50.50/EA.	30.00
NLN-4123A	CASE, CARRYING	50.50/EA.	30.00
NLN-4124A	CASE, CARRYING	50.50/EA.	30.00
NLN-4125A	CASE, CARRYING	50.50/EA.	30.00
NLN-4126A	CASE, CARRYING	50.50/EA.	30.00
NLN-4127A	WALL MOUNT	19.50/EA.	14.75
NLN-4128A	RACK UNIT	19.50/EA.	14.75
NLN-4150A	MODULE	16.50/EA.	10.50
NLN-4327A	MODULE	18.00/EA.	12.60
NLN-4368A	CHASSIS, CHARGER	174.00/EA.	131.00
NLN-4448A	COVER W/CLIP	8.25/EA.	6.25
NLN-4449A	BACK COVER W/CLIP	8.25/EA.	6.25
NLN-4450A	BACK COVER W/CLIP	8.25/EA.	6.25
NLN-4451A	BACK COVER W/CLIP	8.25/EA.	6.25
NLN-4477A	ADAPTOR CABLE	29.75/EA.	22.25
NLN-4537A	SWITCH	34.00/EA.	25.50
NLN-4557A	CHARGER, MT SINGLE	69.00/EA.	51.75
NLN-4558B	CHARGER, MT MULTI	449.00/EA.	337.00
NLN-4559A	CHARGER, MT SINGLE	69.00/EA.	51.75
NLN-4561B	CHARGER, MT SINGLE	69.00/EA.	51.75
NLN-4562C	CHARGER, MT MULTI	449.00/EA.	337.00
NLN-4563B	CHARTER, MT SINGLE	69.00/EA.	51.75
NLN-4564C	CHARGER, MT MULTI	449.00/EA.	337.00
NLN-4565A	CHARGER, MT SINGLE	132.00/EA.	99.00
NLN-4565B	CHARGER, MT SINGLE	132.00/EA.	99.00
NLN-4566B	CHARGER, MT MULTI	863.00/EA.	647.00
NLN-4567A	CHARGER, MT SINGLE	132.00/EA.	99.00
NLN-4567B	CHARGER, MT SINGLE	132.00/EA.	99.00
NLN-4569B	CHARGER, MT SINGLE	132.00/EA.	99.00
NLN-4570C	CHARGER, MT MULTI	863.00/EA.	647.00
NLN-4571B	CHARGER, MT SINGLE	132.00/EA.	99.00
NLN-4572C	CHARGER, MT MULTI	863.00/EA.	647.00
NLN-4605A	TOOL, ALIGNMENT KIT	4.10/EA.	3.00
NLN-4653A	MODULE	18.00/EA.	12.60
NLN-4663A	ACOUSTICAL COUPLER	515.00/EA.	361.00
NLN-4665A	BRACKET, MOUNTING	72.00/EA.	50.50
NLN-4666A	CHARGER	339.00/EA.	237.00
NLN-4667A	CHARGER	339.00/EA.	237.00
NLN-4671A	CHARGER	291.00/EA.	204.00
NLN-4701A	MODULE	21.00/EA.	14.70
NLN-4702A	MODULE	21.00/EA.	14.70
NLN-4743A	BACK COVER W/CLIP	8.25/EA.	6.25
NLN-4744A	BACK COVER W/CLIP	8.25/EA.	6.25
NLN-4787A	CASE	46.25/EA.	34.75
NLN-4950A	CHARGER, H/C MULTI	550.00/EA.	413.00
NLN-4999A	CASE, CARRYING	43.25/EA.	32.50
NLN-5034A	MODULE	15.00/EA.	10.50
NLN-5206A	CHARGER, PT SINGLE	34.00/EA.	25.50
NLN-5222A	MOUNTING KIT	22.75/EA.	22.75
NLN-5223A	MOUNTING KIT	22.75/EA.	17.00
NLN-5411A	COVER, DUST	5.15/EA.	3.60
NLN-5440A	COVER	22.75/EA.	17.00
NLN-5442A	BELTLOOP CASE	6.20/EA.	4.65
NLN-5546A	COVER	22.75/EA.	17.00
NLN-5832A	MODULE	60.00/EA.	42.00
NLN-5925A	MODULE	21.65/EA.	15.15
NLN-6129A	STRAP, CARRYING	7.20/EA.	7.00
NLN-6205A	CAPACITOR KIT	261.00/EA.	215.00
NLN-6262A	BAG	28.75/EA.	26.00
NLN-6268A	SHOCKMOUNT	26.75/EA.	21.50
NLN-6270A	CHARGER	186.00/EA.	148.10
NLN-6310A	BATTERY KIT	7.20/EA.	4.50
NLN-6396B	MOUNTING RACK	54.50/EA.	54.50
NLN-6406A	BATTERY KIT	14.50/EA.	9.80
NLN-6418A	CHARGER, PT VEHICLE	172.00/EA.	120.00
NLN-6426A	MOUNTING KIT	63.75/EA.	51.00
NLN-6474A	CHARGER, PT AC/DC	235.00/EA.	186.90
NLN-6480B	CHARGER, PT MULTI	166.00/EA.	116.00
NLN-6531A	CHARGER, PT AC/DC	212.00/EA.	148.00
NLN-6675A	BACK COVER	8.25/EA.	6.25
NLN-6679A	BACK COVER	8.25/EA.	6.25
NLN-6684B	CHARGER, HT SINGLE	69.00/EA.	51.75
NLN-6686B	CARRYING CASE	43.25/EA.	32.50
NLN-6687A	LANYARD	12.25/EA.	9.25
NLN-6691A	CHARGER, MT VEHICLE	165.00/EA.	124.00
NLN-6692A	ORDER PIECE PARTS	165.00/EA.	124.00
NLN-6738B	CARRYING CASE	43.25/EA.	32.50
NLN-6777B	CARRYING CASE	43.25/EA.	32.50
NLN-6778B	CARRYING CASE	43.25/EA.	32.50
NLN-6780A	LANYARD	13.50/EA.	10.25
NLN-6803B	CASE W/COVER	45.25/EA.	34.00
NLN-6804C	CHARGER, HT SINGLE	69.00/EA.	51.75
NLN-6844B	CASE W/STRAP	43.25/EA.	32.50
NLN-6845B	CASE W/STRAP	43.25/EA.	32.50
NLN-6846B	CASE, CARRYING	43.25/EA.	32.50
NLN-6892A	CHARGER, MT VEHICLE	165.00/EA.	124.00
NLN-6895A	CHARGER, HT SINGLE	132.00/EA.	99.00
NLN-6897B	CHARGER, HT SINGLE	132.00/EA.	99.00
NLN-6993B	CHARGER, HT SINGLE	69.00/EA.	51.75
NLN-6995A	CHARGER, HT SINGLE	132.00/EA.	99.00
NLN-6997C	CHARGER, HT SINGLE	69.00/EA.	51.75
NLN-6999B	CHARGER, HT SINGLE	132.00/EA.	99.00
NLN-7061A	CASE, CARRYING	28.75/EA.	20.25
NLN-7062A	CASE, CARRYING	28.75/EA.	20.25
NLN-7063A	CASE, CARRYING	28.75/EA.	20.25
NLN-7064A	CASE, CARRYING	28.75/EA.	20.25
NLN-7110A	CASE, CARRYING	28.75/EA.	20.25
NLN-7111A	CASE, CARRYING	28.75/EA.	20.25
NLN-7112A	CASE, CARRYING	28.75/EA.	20.25
NLN-7113A	CASE, CARRYING	28.75/EA.	20.25
NLN-7444A	CARRYING CASE	25.75/EA.	19.25
NLN-7493A	CHARGER	19.50/EA.	14.25
NLN-7645A	CHARGER, HT SINGLE	50.50/EA.	38.00
NLN-7646A	CHARGER, HT SINGLE	97.75/EA.	73.25
NLN-7647A	CHARGER, HT SINGLE	50.50/EA.	38.00
NLN-7648A	CHARGER, HT SINGLE	97.75/EA.	73.25
NLN-7693A	CASE	25.75/EA.	18.00
NLN-7965A	CHARGER	258.00/EA.	181.00
NLN-7966A	CHARGER	541.00/EA.	379.00
NLN-8004A	CHARGER, H/C SINGLE	104.00/EA.	85.90
NLN-8005A	CHARGER, H/C SINGLE	56.75/EA.	46.60
NLN-8007A	LANYARD	22.00/EA.	16.50
NLN-8106A	BATTERY COMPARTMENT	9.25/EA.	7.60
NLN-8192A	MODULE	16.50/EA.	10.50
NLN-8318A	EARPIECE	182.00/EA.	164.00
NLN-8410A	HOLDER, MIC	4.10/EA.	3.10
NLN-8423A	BACK COVER	8.25/EA.	6.25
NLN-8424A	BACK COVER	8.25/EA.	6.25
NLN-8460A	CHARGER, H/C VEHICLE	162.00/EA.	122.00
NLN-8464A	CHARGER, H/C SINGLE	56.75/EA.	46.60
NLN-8465A	CHARGER, H/C SINGLE	104.00/EA.	85.90
NLN-8466A	CHARGER, H/C MULTI	261.00/EA.	215.00
NLN-8471B	CARRYING CASE	50.50/EA.	38.00
NLN-8498A	CHEST PACK	10.50/EA.	8.75
NLN-8773A	MODULE	79.50/EA.	55.65
NLN-8775B	MODULE	58.95/EA.	41.25
NLN-8776A	MODULE	54.65/EA.	38.25
NLN-8777B	MODULE	53.60/EA.	37.50
NLN-8778A	TRANSMITTER	70.40/EA.	49.28
NLN-8779A	MODULE	45.00/EA.	31.50
NLN-8856A	CHARGER, MX SINGLE	76.25/EA.	57.25
NLN-8858A	CHARGER, MX SINGLE	146.00/EA.	110.00
NLN-8861B	HOLDER	10.25/EA.	7.75
NLN-8862B	HOLDER	20.50/EA.	15.50
NLN-8875A	ADAPTOR	45.25/EA.	34.00
NLN-8915A	MODULE	15.00/EA.	10.50
NLN-8917A	MODULE	38.60/EA.	27.00
NLN-8918A	MODULE	18.00/EA.	12.60
NLN-8921A	MODULE/MOS	174.30/EA.	122.00
NLN-8946A	AMPLIFIER	62.15/EA.	43.50
NLN-8981A	CHARGER, VEHICULAR	174.00/EA.	131.00
NLN-8988A	CHARGER, MX MULTI	579.00/EA.	434.10
NLN-8990A	CHARGER, MX MULTI	376.00/EA.	282.00
NMD-6008	ACCESSORY KIT	160.00/EA.	120.00
NME-6003B	ACCESSORY KIT	160.00/EA.	120.00
NMN-6006A	MICROPHONE	72.00/EA.	50.50
NMN-6006ASP10	MICROPHONE	79.25/EA.	59.50
NMN-6009B	HEADSET	193.00/EA.	145.00
NMN-6018A	MICROPHONE	61.75/EA.	43.75
NMN-6042C	MICROPHONE	82.50/EA.	62.00
NMN-6050A	MICROPHONE	113.00/EA.	84.75
NMN-6055B	MICROPHONE	52.00/EA.	42.90
NMN-6059B	MICROPHONE	81.00/EA.	60.75
NMN-6064A	HEADSET	202.00/EA.	182.00
NMN-6065A	HEADSET	218.00/EA.	196.00
NMN-6070B	MICROPHONE	89.50/EA.	67.25
NMN-6071B	MICROPHONE	89.50/EA.	67.25
NMN-6071BSP05	MICROPHONE	97.75/EA.	73.25
NMN-6072A	MICROPHONE	109.00/EA.	81.75
NMN-6081A	MODIFICATION KIT	92.75/EA.	69.50
NMN-6082A	MICROPHONE	88.50/EA.	66.50
NMN-6083A	MICROPHONE/SPEAKER	106.00/EA.	79.50
NMN-6086B	HANDSET	86.50/EA.	60.50
NMN-6087A	HEADSET	291.00/EA.	204.00
NMN-6091A	MICROPHONE KIT	160.00/EA.	120.00
NMN-6092A	MICROPHONE KIT	160.00/EA.	120.00
NMN-6093A	MICROPHONE KIT	61.75/EA.	46.25
NMN-6094A	SPEAKER-MICROPHONE	92.75/EA.	69.50
NMN-6095A	SPEAKER-MICROPHONE	92.75/EA.	69.50
NPN-6030B	POWER SUPPLY	49.50/EA.	37.25
NPN-6032A	POWER SUPPLY	139.00/EA.	114.20
NPN-6033A	POWER SUPPLY	49.50/EA.	37.25
NPN-6036A	POWER SUPPLY	71.00/EA.	49.75
NPN-6038A	POWER SUPPLY	71.00/EA.	49.75
NPN-6039A	POWER SUPPLY	256.00/EA.	179.00
NPN-6042A	POWER SUPPLY	60.75/EA.	45.50
NPN-6175A	POWER SUPPLY	51.50/EA.	38.75
NSN-6008A	SPEAKER	21.75/EA.	17.50
PMN-6003A	REMOTE	102.00/EA.	71.50
QKN-8632A	CABLE KIT	36.00/EA.	28.75
QKN-8640A	CABLE	36.00/EA.	25.25
QLN-7691A	MOUNTING KIT	220.00/EA.	154.00
QLN-9203A	SWITCH	1102.00/EA.	934.00
RBPNAD-6219A	ANT H/B HELICAL	225.00/EA.	160.00
RBPNAD-6220A	ANT H/B HELICAL	225.00/EA.	160.00
RBPNAD-6221A	ANT H/B HELICAL	225.00/EA.	160.00
RBPNAD-6222A	ANT H/B HELICAL	225.00/EA.	160.00
RBPNLN-4150A	MODULE	127.20/EA.	89.20
RBPNLN-4658A	MODULE	153.00/EA.	107.10
RBPNLN-5034A	MODULE	127.20/EA.	89.20
RBPNLN-8192A	MODULE	127.20/EA.	89.20
RBPNLN-8915A	MODULE	127.20/EA.	89.20
RBP1-82779C01	ASSEMBLY	111.50/EA.	78.05
RBP21-82428859	CAPACITOR	4.75/EA.	3.35
RBP85-82283J01	ANT H/B HELICAL	90.00/PK./15	55.50
RBP85-82283J02	ANT H/B HELICAL	90.00/PK./15	55.50
RBP85-82283J05	ANT H/B HELICAL	90.00/PK./15	55.50
RBP85-82283J06	ANT H/B HELICAL	90.00/PK./15	55.50
RPX-4028A	CABLE KIT	30.00/EA.	30.00
RPX-4234A	REGULATOR KIT	158.00/EA.	135.00
RRA-4000A	ANT ROOF L/B W/S	47.00/EA.	26.40
RRA-4001A	ANT ROOF L/B W/S	47.00/EA.	26.40
RRA-4002A	ANT ROOF L/B W/S	47.00/EA.	26.40
RRA-4003A	ANT ROOF L/B W/S	47.00/EA.	26.40
RRA-4004A	ANT ROOF L/B L/S	42.50/EA.	24.60
RRA-4005A	ANT ROOF L/B L/S	42.50/EA.	24.60
RRA-4006A	ANT ROOF L/B L/S	42.50/EA.	24.60
RRA-4007A	ANT ROOF L/B L/S	42.50/EA.	24.60
RRA-4008A	ANT TRK LIP L/B W/S	55.00/EA.	30.30
RRA-4009A	ANT TRK LIP L/B W/S	55.00/EA.	30.30
RRA-4010A	ANT TRK LIP L/B W/S	55.00/EA.	30.30
RRA-4011A	ANT TRK LIP L/B W/S	55.00/EA.	30.30
RRA-4012A	ANT TRK LIP L/B L/S	50.50/EA.	28.50
RRA-4013A	ANT TRK LIP L/B L/S	50.50/EA.	28.50
RRA-4014A	ANT TRK LIP L/B L/S	50.50/EA.	28.50
RRA-4015A	ANT TRK LIP L/B L/S	50.50/EA.	28.50
RRA-4016A	ANT COWL L/B W/S	53.50/EA.	30.30
RRA-4017A	ANT COWL L/B W/S	53.50/EA.	30.30
RRA-4018A	ANT COWL L/B W/S	53.50/EA.	30.30
RRA-4019A	ANT COWL L/B W/S	53.50/EA.	30.30
RRA-4020A	ANT COWL L/B L/S	49.00/EA.	28.00
RRA-4021A	ANT COWL L/B L/S	49.00/EA.	28.00
RRA-4022A	ANT COWL L/B L/S	49.00/EA.	28.00
RRA-4023A	ANT COWL L/B L/S	49.00/EA.	28.00
RRA-4024A	ANT MAG L/B W/S	52.00/EA.	30.50
RRA-4025A	ANT MAG L/B W/S	52.00/EA.	30.50
RRA-4026A	ANT MAG L/B W/S	52.00/EA.	30.50
RRA-4027A	ANT MAG L/B W/S	52.00/EA.	30.50
RRA-4028A	ANT MAG L/B L/S	47.50/EA.	28.50
RRA-4029A	ANT MAG L/B L/S	47.50/EA.	28.50
RRA-4030A	ANT MAG L/B L/S	47.50/EA.	28.50
RRA-4031A	ANT MAG L/B L/S	47.50/EA.	28.50
RRA-4032A	ANT CONV KIT L/B W/S	41.50/EA.	23.40
RRA-4033A	ANT CONV KIT L/B W/S	41.50/EA.	23.40
RRA-4034A	ANT CONV KIT L/B W/S	41.50/EA.	23.40
RRA-4035A	ANT CONV KIT L/B W/S	41.50/EA.	23.40
RRA-4036A	ANT CONV KIT L/B L/S	37.50/EA.	22.00
RRA-4037A	ANT CONV KIT L/B L/S	37.50/EA.	22.00
RRA-4038A	ANT CONV KIT L/B L/S	37.50/EA.	22.00
RRA-4039A	ANT CONV KIT L/B L/S	37.50/EA.	22.00
RRA-4040A	ANT ROOF L/B W/S	59.50/EA.	33.00
RRA-4041A	ANT ROOF L/B W/S	59.50/EA.	33.00
RRA-4042A	ANT ROOF L/B W/S	59.50/EA.	33.00
RRA-4043A	ANT ROOF L/B W/S	59.50/EA.	33.00
RRA-4044A	ANT ROOF L/B W/S	59.50/EA.	33.00
RRA-4045A	ANT TRK LIP L/B W/S	65.00/EA.	36.00
RRA-4046A	ANT TRK LIP L/B W/S	65.00/EA.	36.00
RRA-4047A	ANT TRK LIP L/B W/S	65.00/EA.	36.00
RRA-4048A	ANT TRK LIP L/B W/S	65.00/EA.	36.00
RRA-4049A	ANT TRK LIP L/B W/S	65.00/EA.	36.00
RRA-4050A	ANT COWL L/B W/S	65.00/EA.	37.50
RRA-4051A	ANT COWL L/B W/S	65.00/EA.	37.50
RRA-4052A	ANT COWL L/B W/S	65.00/EA.	37.50
RRA-4053A	ANT COWL L/B W/S	65.00/EA.	37.50
RRA-4054A	ANT COWL L/B W/S	65.00/EA.	37.50
RRA-4055A	ANT MAG L/B W/S	65.00/EA.	37.50
RRA-4056A	ANT MAG L/B W/S	65.00/EA.	37.50
RRA-4057A	ANT MAG L/B W/S	65.00/EA.	37.50
RRA-4058A	ANT MAG L/B W/S	65.00/EA.	37.50
RRA-4059A	ANT MAG L/B W/S	65.00/EA.	37.50
RRA-4060A	ANT CONV KIT L/B W/S	48.50/EA.	28.60
RRA-4061A	ANT CONV KIT L/B W/S	48.50/EA.	28.60
RRA-4062A	ANT CONV KIT L/B W/S	48.50/EA.	28.60
RRA-4063A	ANT CONV KIT L/B W/S	48.50/EA.	28.60
RRA-4064A	ANT CONV KIT L/B W/S	48.50/EA.	28.60
RRA-4065A	ANT CONV KIT L/B W/S	47.00/EA.	26.40
RRA-4066A	ANT CONV KIT L/B W/S	47.00/EA.	26.40
RRA-4067A	ANT CONV KIT L/B W/S	47.00/EA.	26.40
RRA-4068A	ANT CONV KIT L/B W/S	47.00/EA.	26.40
RRA-4069A	ANT DISGUISE L/B	39.50/EA.	23.25

Part No.	Description	User Price	NSO Price
RRA-4071A	ANT DISGUISE L/B	41.00/EA.	23.50
RRA-4072A	ANT DISGUISE L/B	76.00/EA.	45.00
RRA-4075A	ANT DISGUISE L/B	80.00/EA.	68.00
RRA-4076A	ANT DISGUISE L/B	80.00/EA.	68.00
79A	ANT DISGUISE L/B	135.00/EA.	114.75
0A	ANT DISGUISE L/B	135.00/EA.	114.75
RRA-4081A	ANT DISGUISE L/B	140.00/EA.	119.00
RRA-4082A	ANT DISGUISE L/B	150.00/EA.	127.50
RRA-4083A	ANT DISGUISE L/B	155.00/EA.	131.75
RRA-4400A	ANT ROOF H/B W/S	42.50/EA.	24.60
RRA-4402A	ANT TRK LIP H/B W/S	48.50/EA.	28.00
RRA-4403A	ANT TRK LIP H/B L/S	44.00/EA.	25.75
RRA-4404A	ANT COWL H/B W/S	51.00/EA.	28.50
RRA-4405A	ANT COWL H/B L/S	48.00/EA.	26.50
RRA-4408A	ANT CONV KIT H/B W/S	31.00/EA.	17.40
RRA-4409A	ANT CONV KIT H/B L/S	26.50/EA.	15.60
RRA-4416A	ANT ROOF H/B W/S	65.00/EA.	36.60
RRA-4411A	ANT TRK LIP H/B W/S	85.00/EA.	48.50
RRA-4412A	ANT COWL H/B W/S	85.00/EA.	48.50
RRA-4413A	ANT MAG H/B W/S	85.00/EA.	48.50
RRA-4414A	ANT CONV KIT H/B W/S	49.00/EA.	27.00
RRA-4415A	ANT CONV KIT H/B W/S	33.50/EA.	19.00
RRA-4417A	ANT TRANSIT DOME H/B	80.00/EA.	45.00
RRA-4418A	ANT TRANSIT DOME H/B	80.00/EA.	45.00
RRA-4424A	ANT ROOF H/B W/S	48.50/EA.	28.20
RRA-4426A	ANT TRK LIP H/B W/S	56.00/EA.	32.75
RRA-4427A	ANT TRK LIP H/B L/S	51.50/EA.	30.50
RRA-4428A	ANT COWL H/B W/S	56.00/EA.	32.75
RRA-4429A	ANT COWL H/B L/S	51.50/EA.	30.50
RRA-4430A	ANT MAG H/B W/S	56.00/EA.	32.75
RRA-4431A	ANT MAG H/B L/S	51.50/EA.	30.50
RRA-4432A	ANT CONV KIT H/B W/S	41.50/EA.	23.40
RRA-4433A	ANT CONV KIT H/B L/S	37.00/EA.	21.60
RRA-4444A	ANT DISGUISE H/B	70.00/EA.	59.50
RRA-4445A	ANT DISGUISE H/B	70.00/EA.	59.50
RRA-4448A	ANT ROOF H/B W/S	42.50/EA.	24.60
RRA-4449A	ANT TRK LIP H/B W/S	48.50/EA.	28.00
RRA-4451A	ANT COWL H/B W/S	51.00/EA.	28.50
RRA-4452A	ANT CONV KIT H/B W/S	31.00/EA.	17.40
RRA-4453A	ANT CONV KIT H/B W/S	33.50/EA.	19.00
RRA-4455A	ANT TRANSIT DOME H/B	98.00/EA.	57.00
RRA-4456A	ANT TRANSIT DOME H/B	98.00/EA.	57.00
RRA-4457A	ANT DISGUISE H/B	80.00/EA.	68.00
RRA-4458A	ANT DISGUISE H/B	80.00/EA.	68.00
59A	ANT DISGUISE H/B	85.00/EA.	72.25
60A	ANT DISGUISE H/B	95.00/EA.	80,75
RRA-4461A	ANT DISGUISE H/B	100.00/EA.	85.00
RRA-4616A	ANT COWL UHF W/S	51.00/EA.	29.50
RRA-4617A	ANT COWL UHF W/S	51.00/EA.	29.50
RRA-4618A	ANT COWL UHF W/S	51.00/EA.	29.50
RRA-4619A	ANT COWL UHF W/S	51.00/EA.	29.50
RRA-4620A	ANT COWL UHF L/S	48,00/EA.	27.70
RRA-4621A	ANT COWL UHF L/S	48.00/EA.	27.70
RRA-4622A	ANT COWL UHF L/S	48.00/EA.	27.70
RRA-4623A	ANT COWL UHF L/S	48.00/EA.	27.70
RRA-4624A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4625A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4626A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4627A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4628A	ANT MAG UHF L/S	50.50/EA.	27.90
RRA-4629A	ANT MAG UHF L/S	50.50/EA.	27.90
RRA-4630A	ANT MAG UHF L/S	50.50/EA.	27.90
RRA-4631A	ANT MAG UHF L/S	50.50/EA.	27.90
RRA-4632A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4633A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4634A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4635A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4648A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4649A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4650A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4651A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4652A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4653A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4654A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4655A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4693A	ANT DISGUISE UHF	75.00/EA.	63.75
RRA-4694A	ANT DISGUISE UHF	80.00/EA.	68.00
RRA-4695A	ANT REAR DECK UHF	100.00/EA.	85.00
RRA-4713A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4714A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4715A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4716A	ANT MAG UHF W/S	54.00/EA.	31.00
RRA-4717A	ANT COWL UHF W/S	51.00/EA.	29.50
RRA-4718A	ANT COWL UHF W/S	51.00/EA.	29.50
19A	ANT COWL UHF W/S	51.00/EA.	29.50
20A	ANT COWL UHF W/S	51.00/EA.	29.50
RRA-4721A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4722A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4723A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4724A	ANT CONV KIT UHF W/S	31.00/EA.	17.40
RRA-4725A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4726A	ANT CONV KIT HUF W/S	35.00/EA.	21.00
RRA-4727A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4728A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4729A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4730A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4731A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4732A	ANT CONV KIT UHF W/S	35.00/EA.	21.00
RRA-4733A	ANT ROOF UHF L/S	45.00/EA.	27.00
RRA-4738A	ANT TRANSIT DOME UHF	53.00/EA.	30.00
RRA-4739A	ANT TRANSIT DOME UHF	53.00/EA.	30.00
RRA-4740A	ANT TRANSIT DOME UHF	53.00/EA.	30.00
RRA-4741A	ANT DISGUISE UHF	90.00/EA.	76.50
RRA-4742A	ANT DISGUISE UHF	90.00/EA.	76.50
RRA-4743A	ANT DISGUISE UHF	95.00/EA.	80.75
RRA-4744A	ANT DISGUISE UHF	105.00/EA.	89.25
RRA-4745A	ANT DISGUISE UHF	110.00/EA.	93.50
RRA-4904A	ANT CONF KIT 800 W/S	27.50/EA.	15.60
RRA-4905A	ANT TRANSIT DOME 800	27.50/EA.	16.00
RRX-4005A	CONNECTOR	18.00/EA.	13.50
RRX-4006A	CONNECTOR	18.00/EA.	13.50
RRX-4007A	CONNECTOR	20.50/EA.	15.50
RRX-4008A	CONNECTOR	20.50/EA.	15.50
RRX-4009A	SPLICE	72.00/EA.	54.00
RRX-4010A	SPLICE	82.50/EA.	62.00
RRX-4011A	CONNECTOR	51.50/EA.	38.75
RRX-4012A	CONNECTOR	48.50/EA.	36.50
RRX-4013A	CONNECTOR	48.50/EA.	36.50
RRX-4014A	CONNECTOR	51.50/EA.	38.75
RRX-4017C	LGTNG/SURGE ARRESTOR	115.00/EA.	86.80
RRX-4018C	LGTNG/SURGE ARRESTOR	122.00/EA.	91.50
RRX-4021B	LGTNG/SURGE ARRESTOR	41.00/EA.	24.00
RRX-4024A	LGTNG/SURGE ARRESTOR	59.00/EA.	41.25
RRX-4025A	LGTNG/SURGE ARRESTOR	59.00/EA.	41.25
RRX-4026A	LGTNG/SURGE ARRESTOR	65.00/EA.	45.50
RRX-4027A	LGTNG/SURGE ARRESTOR	65.00/EA.	45.50
RRX-4028A	LGTNG/SURGE ARRESTOR	57.00/EA.	40.00
RRX-4029A	LGTNG/SURGE ARRESTOR	57.00/EA.	40.00
RRX-4030A	LGTNG/SURGE ARRESTOR	63.00/EA.	44.00
RRX-4031A	LGTNG/SURGE ARRESTOR	63.00/EA.	44.00
RRX-4032A	LGTNG/SURGE ARRESTOR	8.00/EA.	5.60
RRX-4033A	HOT GAS BONDER	4580.00/EA.	3900.00
RRX-4033/230V	HOT GAS BONDER	4580.00/EA.	3900.00
RRX-4034A	LGTNG/SURGE ARRESTOR	44.00/EA.	31.00
SDN-6200A	CABLE KIT	.13/FT.	.13
SDN-6201A	CABLE KIT	.48/FT.	.43
SLN-6571A	SWITCH KIT	91.00/EA.	86.50
SLN-6577B	BOARD	87.00/EA.	79.00
SLN-6584A	DECODER	66.00/EA.	62.75
SLN-6596A	HOUSING KIT	199.00/EA.	170.00
T-1602CM	REMOTE CONTROL CHASS	848.00/EA.	594.00
T-1603CM	CONSOLE	908.00/EA.	636.00
T-1604CM	CONSOLE	994.00/EA.	696.00
T-1760A	ENCODER	315.00/EA.	221.00
T-1760A/A	ENCODER/J252AA Option	526.00/EA.	368.00
T-1761A	ENCODER for Syntor & Micor Radio	315.00/EA.	221.00
T-1761A/A	ENCODER/J52AA Option	526.00/EA.	368.00
T-1761A/AB	ENCODER/J252AA & J201AC Option	530.00/EA.	371.00
T-1761A/AC	ENCODER/J252AA & J119AC Option	535.00/EA.	375.00
T-1761A/C	ENCODER/J119AC Option	323.00/EA.	226.00
T-1818B	ANTENNA KIT	594.00/EA.	416.00
T-1828A	POWER SUPPLY	462.00/EA.	323.00
T-1829A	CONVERTER	462.00/EA.	323.00
T-1881B	DESK SET	586.00/EA.	410.00
T-1882B	DESK SET	639.00/EA.	447.00
T-1884C	DESK SET	325.00/EA.	228.00
T-1886BF	CONVERSION KIT	1627.00/EA.	1139.00
T-1901BA	DESK SET	479.00/EA.	335.00
T-1901BD	DESK SET	499.00/EA.	349.00
T-1901BM	DESK SET	515.00/EA.	350.00
T-1902BA	DESK SET	541.00/EA.	379.00
T-1902BD	DESK SET	551.00/EA.	386.00
T-1902BM	DESK SET	567.00/EA.	397.00
T-1902BN	DESK SET	585.00/EA.	410.00
T-1903CA	DESK SET	218 00/EA.	153.00
T-1903CB	DESK SET	239.00/EA.	167.00
T-1925BA	DESK SET	726.00/EA.	508.00
T-1926B	DESK SET	833.00/EA.	583.00
T-1959A	TUNER	1087.00/EA.	761.00
T-1968A	TUNER	598.00/EA.	416.00
TAB-1001C	ANT SIDE SWIVEL L/B	51.50/EA.	35.00
TAB-1002C	ANT SIDE SWIVEL L/B	51.50/EA.	35.50
TAB-1011C	ANT SIDE SWIVEL L/B	56.75/EA.	38.50
TAB-1012C	ANT SIDE SWIVEL L/B	56.75/EA.	38.50
TAD-1001B	BASE ANT HIGH BAND	219.00/EA.	164.25
TAD-1002B	BASE ANT HIGH BAND	219.00/EA.	164.25
TAD-1003B	BASE ANT HIGH BAND	219.00/EA.	164.25
TAD-1004B	BASE ANT HIGH BAND	219.00/EA.	164.25
TAD-1012B	BASE ANT HIGH BAND	232.00/EA.	174.00
TAD-1013B	BASE ANT HIGH BAND	232.00/EA.	174.00
TAD-1014B	ANTENNA	232.00/EA.	174.00
TAD-1021B	BASE ANT HIGH BAND	276.00/EA.	207.00
TAD-1022B	BASE ANT HIGH BAND	276.00/EA.	207.00
TAD-1023B	BASE ANT HIGH BAND	276.00/EA.	207.00
TAD-1024B	BASE ANT HIGH BAND	276.00/EA.	207.00
TAD-6010A	ANT H/B RR RIGID	149.00/EA.	112.00
TAD-6020A	ANT H/B RAILROAD	66.00/EA.	49.00
TAD-6041A	ANT COAXIAL H/B	82.50/EA.	57.00
TAD-6042A	ANT COAXIAL H/B	82.50/EA.	57.00
TAD-6043A	ANT COAXIAL H/B	82.50/EA.	57.00
TAD-6111A	ANT RF H/B 1/4 WAVE	20.50/EA.	10.00
TAD-6112A	ANT RF H/B 1/4 WAVE	20.50/EA.	10.00
TAD-6113A	ANT RF H/B 1/4 WAVE	20.50/EA.	10.00
TAD-6114A	ANT RF H/B 1/4 WAVE	20.50/EA.	10.00
TAD-6211A	ANT MOTORCYCLE H/B	39.25/EA.	26.25
TAD-6212A	ANT MOTORCYCLE H/B	39.25/EA.	26.25
TAD-6213A	ANT MOTORCYCLE H/B	39.25/EA.	26.25
TAD-6214A	ANT MOTORCYCLE H/B	39.25/EA.	26.25
TAE-6051A	ANT RF UHF 1/4 WAVE	20.50/EA.	10.00
TAE-6052A	ANT RF UHF 1/4 WAVE	20.50/EA.	10.00
TAE-6053A	ANT RF UHF 1/4 WAVE	20.50/EA.	10.00
TAE-6054A	ANT RF UHF 1/4 WAVE	20.50/EA.	10.00
TAE-6061B	ANT ROOF UHF W/S	61.75/EA.	45.50
TAE-6062B	ANT ROOF UHF W/S	61.75/EA.	45.50
TAE-6063B	ANT ROOF UHF W/S	61.75/EA.	45.50
TAE-6071A	ANT ROOF UHF W/S	41.25/EA.	27.75
TAE-6072A	ANT ROOF UHF W/S	41.25/EA.	27.75
TAE-6074A	ANT ROOF UHF W/S	41.25/EA.	27.75
TAE-6075IA	ANT ROOF UHF W/S	41.25/EA.	27.75
TAE-6082B	ANT MOTORCYCLE H/B	86.50/EA.	40.00
TAE-6094B	ANT ROOF UHF W/S	61.75/EA.	45.50
TAE-6095B	ANT ROOF UHF W/S	61.75/EA.	45.50
TAE-6122A	ANT MOTORCYCLE UHF	35.00/EA.	24.00
TAF-6041A	ANT RF 800 1/4 WAVE	25.75/EA.	15.00
TCN-1057BJ	CONTROL HEAD	391.00/EA.	274.00
TCN-1099A	CONTROL HEAD	427.00/EA.	299.00
TCN-1134A	CONTROL HEAD	242.00/EA.	169.00
TCN-1136A	CONTROL HEAD	252.00/EA.	176.00
TCN-1137A	CONTROL HEAD	258.00/EA.	181.00
TCN-1198A	CONTROL HEAD	567.00/EA.	397.00
TCN-1233C	CONTROL HEAD	1025.00/EA.	769.00
TCN-1235C	CONTROL HEAD	1025.00/EA.	769.00
TCN-1241C	CONTROL HEAD	1483.00/EA.	1080.00
TCN-1243C	CONTROL HEAD	1483.00/EA.	1080.00
TCN-1245C	CONTROL HEAD	1483.00/EA.	1080.00
TCN-1270A	CONTROL HEAD	386.00/EA.	270.00
TCN-1271A	CONTROL HEAD	597.00/EA.	418.00
TCN-1326A	CONTROL HEAD	494.00/EA.	394.00
TCN-1330A	CONTROL HEAD	494.00/EA.	394.00
TCN-1353B	CONTROL HEAD	1025.00/EA.	769.00
TCN-1354B	CONTROL HEAD	1025.00/EA.	769.00
TCN-1355B	CONTROL HEAD	1483.00/EA.	964.00
TCN-1356B	CONTROL HEAD	1483.00/EA.	964.00
TCN-1357B	CONTROL HEAD	1483.00/EA.	964.00
TCN-6108BJ	CONTROL HEAD	273.00/EA.	191.00
TCN-6108BK	CONTROL HEAD	288.00/EA.	202.00
TCN-6109AK	CONTROL HEAD	335.00/EA.	235.00
TCN-6109BJ	CONTROL HEAD	324.00/EA.	227.00
TCN-6146A	CONTROL HEAD	304.00/EA.	213.00
TDB-6031A	ANTENNA REQ. FREQ.	335.00/EA.	251.25
TDB-6032A	ANTENNA REQ. FREQ.	320.00/EA.	240.00
TDB-6040A	ANT COUPLER	32.00/EA.	24.00
TDB-6050A	ANT DISGUISE L/B	65.00/EA.	48.00
TDB-6164A	BASE ANT LOW BAND	220.00/EA.	165.00
TDB-6165A	BASE ANT LOW BAND	210.00/EA.	157.50
TDB-6171A	BASE ANT LOW BAND	443.00/EA.	332.25
TDB-6172A	BASE ANT LOW BAND	386.00/EA.	289.50
TDB-6182A	BASE ANT LOW BAND	361.00/EA.	271.75
TDC-6011A	BASE ANT MID BAND	320.00/EA.	240.00
TDC-6060A	BASE ANT MID BAND	355.00/EA.	266.25
TDC-6012A	BASE ANT MID BAND	185.00/EA.	138.75
TDD-6071A	BASE ANT HIGH BAND	425.00/EA.	318.75
TDD-6072A	BASE ANT HIGH BAND	425.00/EA.	318.75
TDD-6073A	BASE ANT HIGH BAND	425.00/EA.	318.75
TDD-6074A	BASE ANT HIGH BAND	425.00/EA.	318.75
TDD-6075A	BASE ANT HIGH BAND	425.00/EA.	318.75
TDD-6081A	BASE ANT HIGH BAND	535.00/EA.	401.25
TDD-6082A	BASE ANT HIGH BAND	535.00/EA.	401.25
TDD-6083A	BASE ANT HIGH BAND	535.00/EA.	401.25
TDD-6084A	BASE ANT HIGH BAND	535.00/EA.	401.25
TDD-6085A	BASE ANT HIGH BAND	535.00/EA.	401.25
TDD-6110A	ANT EXCALIBER H/B	82.50/EA.	70.00
TDD-6120A	ANT COUPLER	32.00/EA.	27.20
TDD-6130A	ANT DISGUISE H/B	40.25/EA.	31.50
TDD-6140A	ANT DISGUISE H/B	53.50/EA.	39.00
TDD-6200A	DUPLEXER	922.00/EA.	738.00
TDD-6240A	CAVITY	552.00/EA.	414.00
TDD-6250A	CAVITY	149.00/EA.	112.00
TDD-6270A	CAVITY	103.00/EA.	77.25
TDD-6310A	IPA INPT REPAIR KIT	322.00/EA.	242.00

Part No.	Description	User Price	NSO Price
TDD-6501A	BASE ANT HIGH BAND	149.00/EA.	111.75
TDD-6511A	BASE ANT HIGH BAND	639.00/EA.	479.25
TDD-6681A	BASE ANT HIGH BAND	305.00/EA.	228.75
TDD-6682A	BASE ANT HIGH BAND	305.00/EA.	228.75
TDD-6683A	BASE ANT HIGH BAND	305.00/EA.	228.75
TDD-6684A	BASE ANT HIGH BAND	305.00/EA.	228.75
TDD-6740A	ANTENNA	191.00/EA.	143.25
TDD-6760A	ANTENNA	358.00/EA.	268.50
TDE-6041A	BASE ANT 450 MHZ	545.00/EA.	408.75
TDE-6042A	BASE ANT 450 MHZ	545.00/EA.	408.75
TDE-6046A	BASE ANT 450 MHZ	545.00 EA.	408.75
TDE-6047A	BASE ANT 450 MHZ	545.00 EA.	408.75
TDE-6048A	BASE ANT 450 MHZ	545.00/EA.	408.75
TDE-6049A	BASE ANT 450 MHZ	545.00 EA.	408.75
TDE-6051A	BASE ANT 450 MHZ	640.00 EA.	480.00
TDE-6052A	BASE ANT 450 MHZ	640.00 EA.	480.00
TDE-6058A	BASE ANT 450 MHZ	640.00 EA.	480.00
TDE-6081A	BASE ANT 450 MHZ	240.00/EA.	180.00
TDE-6082A	BASE ANT 450 MHZ	240.00/EA.	180.00
TDE-6086A	BASE ANT 450 MHZ	240.00/EA.	180.00
TDE-6087A	BASE ANT 450 MHZ	240.00 EA.	180.00
TDE-6088A	BASE ANT 450 MHZ	240.00 EA.	180.00
TDE-6089A	BASE ANT 450 MHZ	240.00 EA.	180.00
TDE-6090A	BASE ANT 450 MHZ	145.00/EA.	108.75
TDE-6091A	BASE ANT 450 MHZ	145.00 EA.	108.75
TDE-6092A	BASE ANT 450 MHZ	145.00 EA.	108.75
TDE-6100A	ANT EXCALIBER UHF	32.00/EA.	27.20
TDE-6110A	ANT COUPLER	32.00/EA.	27.20
TDE-6120A	ANT DISGUISE UHF	60.75/EA.	41.25
TDE-6210A	IPA INPT REPAIR KIT	1088.00/EA.	816.00
TDE-6260A	BASE ANT 450 MHZ	405.00/EA.	303.75
TDE-6261A	BASE ANT 450 MHZ	405.00/EA.	303.75
TDE-6270A	BASE ANT 450 MHZ	450.00 EA.	337.50
TDE-6271A	BASE ANT 450 MHZ	450.00/EA.	337.50
TDE-6272A	BASE ANT 450 MHZ	450.00/EA.	337.50
TDE-6273A	BASE ANT 450 MHZ	450.00/EA.	337.50
TDE-6274A	BASE ANT 450 MHZ	450.00/EA.	337.50
TDE-6275A	BASE ANT 450 MHZ	450.00/EA.	337.50
TDE-6276A	BASE ANT 450 MHZ	450.00/EA.	337.50
TDE-6277A	BASE ANT 450 MHZ	725.00/EA.	543.75
TDE-6278A	BASE ANT 450 MHZ	725.00/EA.	543.75
TDE-6279A	BASE ANT 450 MHZ	725.00/EA.	543.75
TDE-6280A	BASE ANT 450 MHZ	725.00/EA.	543.75
TDE-6281A	BASE ANT 450 MHZ	725.00/EA.	543.75
TDE-6282A	BASE ANT 450 MHZ	725.00/EA.	543.75
TDE-6390A	BASE ANT 450 MHZ	314.00/EA.	235.50
TDE-6400A	BASE ANT 450 MHZ	515.00/EA.	386.25
TDE-6630A	ANTENNA	78.25/EA.	58.75
TDF-6030A	BASE ANT 800 MHZ	723.00/EA.	542.25
TDE-6040A	BASE ANT 800 MHZ	996.00/EA.	747.00
TDF-6120A	BASE ANT 800 MHZ	730.00/EA.	54:7.50
TDF-6130A	BASE ANT 800 MHZ	205.00/EA.	153.75
TDF-6311A	BASE ANT 800 MHZ	110.00/EA.	82.50
TDF-6321A	ANTENNA	200.00/EA.	150.00
TDN-6015A	COAXIAL CABLE KIT	6.20/EA.	5.00
TDN-6017B	MOUNTING KIT	35.00/EA.	24.50
TDN-6056A	MOUNTING KIT	180.00/EA.	126.00
TDN-6073A	MOUNTING KIT	145.00/EA.	102.00
TDN-6076A	CONNECTOR	20.00/EA.	18.00
TDN-6077A	CONNECTOR	20.00/EA.	18.00
TDN-6078A	CONNECTOR	22.25/EA.	20.00
TDN-6079A	CONNECTOR	22 25/EA.	20.00
TDN-6080A	CONNECTOR	78.25/EA.	70.50
TDN-6088A	SPLITTER	99.00/EA.	89.00
TDN-6251A	SPEAKER	185.00/EA.	139.00
TDN-6252A	SPEAKER	170.00/EA.	128.00
TDN-6253A	SPEAKER	134.00/EA.	101.00
TDN-6254A	SPEAKER	155.00/EA.	132.00
TDN-6581A	RACK	53.50/EA.	37.50
TDN-6670A	STRAP	28.25/EA.	25.50
TDN-6673A	GROUND KIT	13.75/EA.	12.50
TDN-6674A	CLIP	19.50/EA.	17.50
TDN-6676A	CONNECTOR	18.00 EA.	16.25
TDN-6684A	ADAPTOR	82.50 EA.	74.25
TDN-6687A	MOUNTING KIT	135.00/EA.	122.00
TDN-6688A	MOUNTING KIT	135.00 EA.	122.00
TDN-6699A	BAT NICKEL CADMIUM	786.00/EA.	486.00
TDN-6700A	BAT NICKEL CADMIUM	937.00/EA.	646.00
TDN-6701A	BAT NICKEL CADMIUM	1000.00/EA.	751.00
TDN-6714A	CABLE AND CONNECTOR	82.50/EA.	70.25
TDN-6725A	CABLE AND CONNECTOR	36.00/EA.	28.75
TDN-6727A	CABLE AND CONNECTOR	36.00/EA.	28.75
TDN-6734A	CABLE AND CONNECTOR	36.00/EA.	28.75
TDN-6828A	PAPER	6.20/EA.	6.20
TDN-6834A	CABLE KIT	50.50/EA.	50.50
TDN-6850A	CABLE KIT	36.00/EA.	30.50
TDN-6853A	CABLE KIT	36.00/EA.	30.50
TEN-1001A	INSTALLATION KIT	36.00/EA.	25.25
TEN-6082A	INSULATION	36.00/EA.	27.00
THN-6124A	HOUSING KIT	61.75/EA.	43.25
THN-6125A	HOUSING KIT	36.00/EA.	25.25
THN-6182A	HOUSING KIT	283.00/EA.	198.00
TK-173025	TRANSMISSION LINE	21.25/EA.	15.55
TK-173030	TRANSMISSION LINE	23.15/EA.	16.90
TK-173050	TRANSMISSION LINE	30.75/EA.	22.30
TK-173075	TRANSMISSION LINE	40.25/EA.	29.05
TK-173100	TRANSMISSION LINE	49.75/EA.	35.80
TK-173125	TRANSMISSION LINE	59.25/EA.	42.55
TK-173150	TRANSMISSION LINE	68.75/EA.	49.30
TK-173200	TRANSMISSION LINE	87.75/EA.	62.80
TK-173500	TRANSMISSION LINE	201.75/EA.	143.80
TKN-6104A	CABLE KIT	97.35/EA.	68.15
TKN-6346B	CABLE KIT	17.50/EA.	12.25
TKN-6347B	CABLE KIT	24.75/EA.	17.25
TKN-6348B	CABLE KIT	32.00/EA.	22.50
TKN-63498B	CABLE KIT	42.25/EA.	30.25
TKN-6350B	CABLE KIT	19.50/EA.	13.75
TKN-6351B	CABLE KIT	27.75/EA.	20.75
TKN-6352B	CABLE KIT	40.25/EA.	28.25
TKN-6353B	CABLE KIT	47.50/EA.	33.25
TKN-6456A	POWER CABLE	5.15/EA.	3.85
TKN-6458A	CABLE AND FUSE KIT	15.50/EA.	11.50
TKN-6553A	INTERCABLE	53.50/EA.	37.50
TKN-6556A	CABLE KIT	57.75/EA.	40.50
TKN-6558A	INTERCABLE	53.50/EA.	37.50
TKN-6559A	INTERCABLE	53.50/EA.	37.50
TKN-6587A	CABLE KIT	164.00/EA.	115.00
TKN-6588A	CABLE KIT	267.00/EA.	187.00
TKN-6718A	CABLE	97.75/EA.	73.25
TKN-6788A	CABLE KIT	117.00/EA.	82.00
TKN-6789A	CABLE	291.00/EA.	204.00
TKN-6794A	POWER CABLE	6.20/EA.	4.65
TKn-6811A	CABLE ASSEMBLY	3.10/EA.	2.35
TKN-6842A	CABLE	6.20/EA.	4.65
TKN-6934A	ADAPTOR CABLE	41.25/EA.	31.00
TKN-6948A	POWER CABLE	9.25/EA.	6.95
TKN-6949A	POWER CABLE	11.25/EA.	8.45
TKN-6979A	CABLE KIT	18.00/EA.	12.50
TKN-6980A	CABLE KIT	12.00/EA.	8.50
TKN-6992A	POWER CABLE	6.20/EA.	4.65
TKN-6995A	INTERCABLE	9.25/EA.	6.95
TKN-8009A	CABLE	97.75/EA.	73.25
TKN-8059A	POWER CABLE	6.20/EA.	4.65
TKn-8065A	CABLE	41.25/EA.	31.00
TKN-8069A	ADAPTOR CABLE	41.25/EA.	31.00
TKN-8071A	ADAPTOR CABLE	41.25/EA.	31.00
TKN-8087A	CABLE	87.50/EA.	61.25
TKN-8088A	CABLE	92.75/EA.	65.00
TKN-8089A	CABLE	87.50/EA.	61.25
TKN-8090A	CABLE	92.75/EA.	65.00
TKN-8106A	CABLE	6.20/EA.	4.65
TKN-8118A	CABLE KIT	31.00/EA.	21.75
TKN-8119A	CABLE	11.25/EA.	7.80
TKN-8123A	CABLE	59.75/EA.	41.75
TKN-8168A	CABLE KIT	66.00/EA.	46.25
TKN-8169A	CABLE KIT	82.50/EA.	62.00
TKN-8183A	CABLE KIT	20.50/EA.	15.50
TKN-8184A	CABLE KIT	16.50/EA.	12.50
TKN-8185A	CABLE KIT	23.75/EA.	17.75
TKN-8186A	CABLE KIT	29.75/EA.	22.25
TKN-8187A	CABLE KIT	40.25/EA.	30.25
TKN-8188A	CABLE	20.50/EA.	20.50
TKN-8189A	CABLE	16.50/EA.	12.50
TLN-1007C	SINGLE UNIT RACK	191.00/EA.	134.00
TLN-1126A	REMOTE CONTROL CHASS	224.00/EA.	157.00
TLN-1127A	REMOTE CONTROL CHASS	199.00/EA.	139.00
TLN-1181A1800	DECODER	130.00/EA.	91.00
TLN-1218C	JUNCTION BOX	206.00/EA.	144.00
TLN-1250A	CONTROL	121.00/EA.	84.75
TLN-1251A	CONTROL	121.00/EA.	84.75
TLN-1252A	CONTROL	195.00/EA.	137.00
TLN-1389A	QUIK-CALL LESS REEDS	182.00/EA.	127.00
TLN-1390A	QUIK-CALL LESS REEDS	193.00/EA.	135.00
TLN-1391A	QUIK-CALL LESS REEDS	220.00/EA.	154.00
TLN-1400A	ADAPTOR	427.00/EA.	299.00
TLN-1447A	INTERCOM BOARD	157.00/EA.	110.00
TLN-1477A	SWITCH KIT	54.50/EA.	41.20
TLN-1478A	SWITCH KIT	54.50/EA.	41.20
TLN-1480A	FREQUENCY KIT	61.75/EA.	43.25
TLN-1481A	SWITCH KIT	54.50/EA.	41.20
TLN-1482A	SWITCH KIT	61.75/EA.	46.70
TLN-1483A	ALTERNATOR LINE SW	59.75/EA.	45.50
TLN-1484A	TONE LOTL	136.00/EA.	103.00
TLN-1485A	PHONE PATCH	218.00/EA.	165.00
TLN-1488A	TRANSMITTER	69.00/EA.	52.00
TLN-1490A	AUDIO BOARD	77.25/EA.	54.00
TLN-1492A	SWITCH KIT	67.00/EA.	53.50
TLN-1493B	RECEIVER	77.25/EA.	54.00
TLN-1494B	WILD CARD MODULE	77.25/EA.	54.00
TLN-1495B	WILD CARD MODULE	77.25/EA.	54.00
TLN-1497A	ENCODER	59.75/EA.	45.50
TLN-1498A	SPEAKER	54.50/EA.	41.00
TLN-1499A	MUTE MODULE	54.50/EA.	41.20
TLN-1500A	SWITCH KIT	37.00/EA.	26.00
TLN-1501A	PAGING CONTROL KIT	84.50/EA.	63.50
TLN-1502A	PRIVATE LINE BOARD	110.00/EA.	83.75
TLN-1504A	SPEECH SCRAMBLER	244.00/EA.	184.00
TLN-1505A	ENCODER	164.00/EA.	124.00
TLN-1506A	SWITCH KIT	151.00/EA.	112.00
TLN-1507A	ACCESSORY SWITCH	58.75/EA.	47.00
TLN-1512A	MULTIPLIER KIT	209.00/EA.	146.00
TLN-1513B	JUNCTION BOX	117.00/EA.	82.00
TLN-1514A	HANDSET HANG-UP BOX	217.00/EA.	175.00
TLN-1515A	HANDSET HANG-UP BOX	232.00/EA.	175.00
TLN-1517A	CONSOLE	45.25/EA.	34.00
TLN-1541A	SWITCH KIT	54.50/EA.	38.25
TLN-1546B	RECEIVER	75.25/EA.	57.20
TLN-1562A	SQUELCH LINE	178.00/EA.	134.00
TLN-1650A	BUSY LIGHT	66.00/EA.	46.25
TLN-1652A	BUSY LIGHT	130.00/EA.	98.50
TLN-1653A	CONTROL	110.00/EA.	77.00
TLN-1658A	WILD CARD MODULE	73.25/EA.	55.00
TLN-1671A	PHONE PATCH	211.00/EA.	160.00
TLN-1695A	ENCODER	263.00/EA.	184.00
TLN-1696A	DECODER	340.00/EA.	238.00
TLN-1702A	ENCODER	194.00/EA.	147.00
TLN-1704B	SIREN	391.00/EA.	274.00
TLN-1705B	SIREN	391.00/EA.	274.00
TLN-1718B	MODULE	368.00/EA.	258.00
TLN-1799A	METER KIT	85.50/EA.	59.75
TLN-1877A	SPEAKER	97.75/EA.	73.25
TLN-1918B	SWITCH KIT	36.00/EA.	25.25
TLN-1919B	SWITCH KIT	62.75/EA.	44.00
TLN-1920A	MODULE TRC	102.00/EA.	71.50
TLN-1921B	SWITCH	38.00/EA.	27.00
TLN-1922B	SWITCH	51.50/EA.	36.00
TLN-1923A	PAGING CONTROL KIT	107.00/EA.	75.00
TLN-1971B	HANDSET ASSEMBLY	752.00/EA.	564.00
TLN-1975B	HANDSET	752.00/EA.	564.00
TLN-2009A	CABLE KIT	12.25/EA.	9.20
TLN-2010A	CABLE KIT	18.50/EA.	14.00
TLN-2196A	PRE-AMPLIFIER KIT	46.25/EA.	32.50
TLN-2197A	INTERFACE KIT	201.00/EA.	135.00
TLN-2206A	INSTALLATION KIT	162.00/EA.	113.00
TLN-2213A	ADAPTOR	232.00/EA.	162.00
TLN-2214A	ADAPTOR	232.00/EA.	162.00
TLN-2215A	ADAPTOR	232.00/EA.	162.00
TLN-2216A	ADAPTOR	232.00/EA.	162.00
TLN-2226B	FIELD INSTALLED KIT	157.00/EA.	110.00
TLN-2227A	FIELD INSTALLED KIT	48.50/EA.	34.00
TLN-2228A	FIELD INSTALLED KIT	26.75/EA.	13.75
TLN-2228B	INTERCOM SWITCH	26.75/EA.	18.75
TLN-2232A	DIAL	129.00/EA.	96.75
TLN-2235A	RETROFIT	201.00/EA.	141.00
TLN-2257A	SCANNER BOARD	149.00/EA.	104.00
TLN-2258A	SCANNER BOARD	206./00/EA.	155.00
TLN-2293B	HANDSET W/CRADLE	752.00/EA.	564.00
TLN-2295B	HANDSET W/CRADLE	752.00/EA.	564.00
TLN-2321A	PHONE	948.00/EA.	711.00
TLN-2365A	JUNCTION BOX	201.00/EA.	151.00
TLN-2366A	JUNCTION BOX	613.00/EA.	460.00
TLN-2367A	RETROFIT	484.00/EA.	363.00
TLN-2431A	RETROFIT	201.00 EA.	141.00
TLN-4399A	LGTNG/SURGE ARRESTOR	35.00/EA.	24.50
TLN-4427A	WALL MOUNT	36.00/EA.	28.75
TLN-4504A	HANDSET ASSEEMBLY	41.25/EA.	29.00
TLN-4505A	HANDSET HANG-UP BOX	10.25/EA.	7.75
TLN-4533A	RELAY KIT	29.75/EA.	21.00
TLN-4662A	MODULE	106.00/EA.	74.25
TLN-4698A	HANDSET HANG-UP BOX	41.25/EA.	31.00
TLN-4890A	MOUNTING KIT	73.25/EA.	51.25
TLN-4961A	MODULE	87.50/EA.	61.25
TLN-5057A	RELAY	54.50/EA.	38.25
TLN-5088A	MODE	255.00/EA.	130.00
TLN-5158A	SERVICE BOARD	48.25/EA.	37.50
TLN-5277B	NEGATIVE FILTER	82.50/EA.	57.75
TLN-5459A	FRAME ACCESSORIES	36.00/EA.	25.25
TLN-5907A	MOUNTING KIT	15.50/EA.	11.75
TLN-5920A	LGTNG/SURGE ARRESTOR	39.00/EA.	27.50
TLN-6182A	ANT MOUNTING KIT	15.50/EA.	12.00
TLN-6287C	FOOT SWITCH KIT	63.75/EA.	44.75
TLN-6377A	FOOT SWITCH KIT	29.75/EA.	20.75
TLN-6414A	ANT MOUNTING KIT	15.50/EA.	12.00
TLN-6489A	HANDSET HANG-UP BOX	45.25/EA.	31.75
TLN-6490A	HANDSET HANG-UP BOX	74.25 EA.	52.00
TLN-6586A	FILTER	247.00/EA.	173.00
TLN-6685A	MOUNTING KIT	24.75/EA.	17.50
TLN-8362A	MOUNTING RACK	113.00 EA.	79.00
TLN-8617B	RELAY	503.00/EA.	352.00
TLN-8845A	NOISE REDUCTION KIT	10.25/EA.	7.75

Part No.	Description	User Price	NSO Price
TMN-1004B	MICROPHONE, DESK	71.00/EA.	53.25
TMN-1005B	MICROPHONE, DESK	77.25/EA.	54.00
TMN-1008C	MICROPHONE, DESK	77.25/EA.	54.00
TMN-1009C	MICROPHONE	73.25/EA.	53.25
TMN-1016B	HANDSET	92.75/EA.	65.00
TMN-1018C	MICROPHONE, DESK	80.25/EA.	60.25
TMN-1021C	MICROPHONE, DESK	80.25/EA.	60.25
TMN-1022C	MICROPHONE, DESK	82.50/EA.	62.00
TMN-6002D	HANDSET ASSEMBLY	118.00/EA.	82.50
TMN-6013A	MICROPHONE	46.25/EA.	34.75
TMN-6043B	MICROPHONE	129.00/EA.	90.25
TMN-6054A	MICROPHONE	56.75/EA.	39.25
TMN-6057A	MICROPHONE	72.00/EA.	50.50
TMN-6067A	HANDSET	82.50/EA.	57.75
TMN-6071A	MICROPHONE	76.25/EA.	53.50
TMN-6082A	HANDSET	97.75/EA.	68.50
TMN-6090A	HEADSET	258.00/EA.	181.00
TMN-6102A	MICROPHONE KIT	69.00/EA.	48.25
TMN-6104B	MICROPHONE	49.50/EA.	37.25
TMN-6112A	HANDSET	96.75/EA.	67.75
TMN-6113A	HANDSET	58.75/EA.	44.00
TMN-6116A	MICROPHONE	77.25/EA.	54.00
TMN-6134B	MICROPHONE	49.50/EA.	37.25
TMN-6137A	HANDSET	58.75/EA.	44.00
TPN-1136A	POWER SUPPLY	252.00/EA.	176.00
TPN-1154A	POWER SUPPLY	200.00/EA.	224.00
TPN-1175A	POWER SUPPLY	592.00/EA.	444.00
TPN-1177A	POWER SUPPLY	304.00/EA.	213.00
TRN-4047A	MOUNTING TRAY	36.00/EA.	25.25
TRN-4353A	MODULE	41.25/EA.	31.00
TRN-4360A	BASE TRAY	33.00/EA.	24.75
TRN-4394A	CABLE	82.50/EA.	57.75
TRN-5140A	CONNECTOR	25.75/EA.	18.00
TRN-6194A	SHIELD KIT	66.00/EA.	46.25
TRN-6283A	PL HANG-UP BOX	13.50/EA.	10.25
TRN-6284A	HANG-UP BOX	20.50/EA.	14.50
TRN-6296A	CORD	59.75/EA.	42.00
TRN-6309A	PHONE PATCH	668.00/EA.	468.00
TRN-6319A	HANG-UP BOX	34.00/EA.	26.25
TRN-6450A	BOARD REPL KIT	556.00/EA.	489.00
TRN-6468B	TRANSLATOR	501.00/EA.	376.00
TRN-6524A	HARDWARE KIT	3.10/EA.	2.35
TRN-6617A	CURCUIT BOARD	258.00/EA.	194.00
TRN-6796B	REMOTE	197.00/EA.	138.00
TRN-6822A	AUDIO BOARD	110.00/EA.	77.00
TRN-6948A	WIRE KIT	1.05/EA.	.80
TRN-8495A	PANEL TRAY W/CLIP	25.75/EA.	19.25
TRN-8496A	BASE	25.75/EA.	19.25
TRN-8684B	TIME—OUT TIMER BOARD	89.50/EA.	62.75
TRN-8885A	CONNECTOR	5.15/EA.	4.15
TRN-8886A	CONNECTOR	5.15/EA.	4.15
TRN-8989A	MICROPHONE, DYNAMIC	288.00/EA.	200.00
TSN-1001A	SPEAKER	72.00/EA.	54.00
TSN-1002A	SPEAKER	72.00/EA.	54.00
TSN-1003A	SPEAKER	72.00/EA.	54.00
TSN-1004A	SPEAKER	77.25/EA.	58.00
TSN-6005A	SPEAKER	35.00/EA.	24.50
TSN-6006A	SPEAKER	42.25/EA.	29.50
TSN-6007A	SPEAKER	51.50/EA.	36.00
TSN-6015A	SPEAKER	108.00/EA.	75.50
TSN-6016B	SPEAKER	34.00/EA.	23.75
TSN-6022B	SPEAKER, MOBILE	29.75/EA.	22.25
TSN-6030A	SPEAKER, MOBILE	29.75/EA.	22.25
VCN-6100A	MOUNTING KIT	35.00/EA.	35.00
01-5617G01	READOUT KIT	206.00/EA.	155.00
01-5951D91	HOUSING, BATTERY	7.90/EA.	5.53
01-5952G04	STRAP	3.10/EA.	2.35
01-5953G52	CASE	28.75/EA.	20.25
01-5953G53	CASE	28.75/EA.	20.25
01-5953G55	CASE	28.75/EA.	20.25
01-5953G57	CASE	28.75/EA.	20.25
01-80371A43	ANT ROD	15.00/EA.	11.25
01-80371A44	ANT BASE ASSM	16.00/EA.	12.00
01-80371A47	ANT MATCHING SECTION	53.50/EA.	40.15
01-80371A48	ANT MATCHING SECTION	53.75/EA.	40.30
01-80371A49	ANT ROD	32.65/EA.	22.85
01-80371A52	ANT BASE ASSM	66.50/EA.	50.00
01-80371A54	ANT BASE ASSM	66.50/EA.	50.00
01-80371A55	ANT BASE ASSM	23.50/EA.	17.65
01-80371A56	ANT BASE ASSM	40.00/EA.	34.00
01-80371A57	ANT BASE ASSM	56.00/EA.	42.00
01-80371A58	ANT MATCHING SECTION	50.00/EA.	42.50
01-80371A59	ANT BASE ASSM	56.00/EA.	42.00
01-80371A60	ANT BASE ASSM	66.50/EA.	50.00
48-8 80371A61	ANT ROD	20.00/EA.	15.00
48-8 80371A62	ANT BASE ASSM	66.50/EA.	50.00
01-80371A63	ANT MATCHING SECTION	45.00/EA.	38.25
01-80371A91	ANT MOUNTING KIT	32.00/EA.	24.00
01-80371A94	ANT MATCHING SECTION	92.75/EA.	69.56
01-80372A40	ANT BASE ASSM	51.00/EA.	38.00
01-80372A41	ANT BASE ASSM	53.00/EA.	40.00
01-80372A42	ANT BASE ASSM	27.00/EA.	20.00
01-80372A43	ANT BASE ASSM	42.50/EA.	32.00
01-80386A36	ELECTRO STATIC KIT	59.50/EA.	51.00
01-80386A81	SOLDER STATION	188.00/EA.	160./00
01-80393A26	SWITCH W/BUTTONS	50.20/EA.	35.15
01-80393A31	SWITCH W/BUTTONS	113.30/EA.	78.90
01-80705A18	FUSE CLIP AND LEAD	6.67/EA.	4.67
01-80705A19	FUSE CLIP AND LEAD	7.40/EA.	5.20
01-80726B27	CONNECTOR	27.25/EA.	19.20
01-80739B46	DIODE OPTICAL RCVER	369.30/EA.	260.05
02-80387A67	NUT	.82/EA.	.72
03-84351K02	SCREW	3.10/EA.	2.17
05-7707	RIVET	1.45/PK./100	1.00
06-5139G01	RESISTOR	.45/EA.	.30
07-80321A87	TRIM	44.90/EA.	31.65
07-84049D01	BRACKET	24.80/EA.	17.45
09-848776	CONNECTOR	29.70/EA.	20.80
10-10041A18	SOLDER	70.50/LB.	60.00
10-10041A61	SOLDER	26.00/EA.	22.00
10-10041A86	SOLDER	15.85/LB./1	13.50
11-5092E02	TAPE	2.20/PK./1	1.55
13-6510A04	ESCUTCHEON	10.40/EA.	7.30
13-6510A16	ESCUTCHEON	127.80/EA.	90.00
13-82286C11	ESCUTCHEON	5.35/EA.	3.75
13-83133K07	ESCUTCHEON	3.10/EA.	2.17
13-83133K08	ESCUTCHEON	3.10/EA.	2.17
13-83133K09	ESCUTCHEON	3.10/EA.	2.17
13-83133K10	ESCUTCHEON	3.10/EA.	2.17
13-83133K45	ESCUTCHEON	3.10/EA.	2.20
13-83571L03	ESCUTCHEON	3.10/EA.	2.20
13-83571L04	ESCUTCHEON	3.10/EA.	2.20
13-84228L36	SWITCH	12.15/EA.	8.55
13-84512L10	ESCUTCHEON	3.10/EA.	2.20
14-80311A92	INSULATOR	1.35/EA.	.95
14-82026L01	INSULATOR	2.05/EA.	1.45
14-82098D02	INSULATOR	.95/EA.	.70
14-82389H01	INSULATOR	10.10/EA.	7.10
14-84208D73	INSULATOR	138.15/EA.	97.30
14-84266C01	CIRCUIT BOARD	6.25/PK./2	4.40
15-5276F01	CARRYING CASE	43.25/EA.	32.50
15-5276F02	CARRYING CASE	43.25/EA.	32.50
15-5276F03	CARRYING CASE	43.25/EA.	32.50
15-5276F04	CARRYING CASE	43.25/EA.	32.50
15-5332D01	COVER	5.15/EA.	3.90
15-5333D03	CASE, CARRYING	40.25/EA.	30.25
15-5333D04	CASE, CARRYING	40.25/EA.	30.25
15-5333D05	CASE, CARRYING	40.25/EA.	30.25
15-5333D06	CASE, CARRYING	40.25/EA.	30.25
15-5333D07	CASE, CARRYING	40.25/EA.	30.25
15-5333D08	CASE, CARRYING	40.25/EA.	30.25
15-5333D09	CASE, CARRYING	40.25/EA.	30.25
15-5333D10	CASE, CARRYING	40.25/EA.	30.25
15-5333D11	CASE, CARRYING	40.25/EA.	30.25
15-5466E01	CASE, CARRYING	43.25/EA.	32.50
15-5778B01	CASE	38.75/EA.	27.25
15-5859B01	COVER	15.00/EA.	12.00
15-82064K02	HOUSING	21.30/EA.	14.90
15-82501J01	COVER	4.65/EA.	3.50
15-82501J02	COVER	4.65/EA.	3.50
15-82535J02	CASE CARRYING	4.10/EA.	3.10
15-84122H01	HOUSING, BATTERY	14.50/EA.	10.15
15-84126G01	COVER	1.60/EA.	1.15
15-84517L04	HOUSING	7.45/EA.	5.00
21-82213E08	CAPACITOR	.30/EA.	.20
21-82358G96	CAPACITOR	.35/EA.	.25
23-83093G24	CAPACITOR	8.00/EA.	5.60
24-5193E01	COIL	3.18/EA.	2.23
25-80323A44	TRANSFORMER	21.20/EA.	14.90
25-80387A66	REGULATOR	152.50/EA.	130.00
25-82004F01	TRANSFORMER	11.80/EA.	8.35
25-82505G01	TRANSFORMER	99.05/EA.	69.75
25-86218B02	TRANSFORMER	285.95/EA.	201.35
28-80387A69	CONNECTOR	5.50/EA.	4.70
28-8688660	PLUG, BANANA	5.10/EA.	3.55
30-80329A22	CABLE	1.70/FT.	1.19
30-80329A23	CABLE	4.43/FT.	3.10
30-82954C02	CABLE	5.20/FT.	3.64
30-83060A01	CABLE	6.20/EA.	4.35
30-84091A01	CABLE, SHIELDED	1.90/EA.	1.35
30-892534	CABLE, W/PLUS	3.35/EA.	2.35
32-5386D02	GASKET, DUST	2.30/PK./5	1.61
32-5761E01	COVER	1.45/PK./10	1.02
37-61346	SLEEVE	2.00/PK./10	1.40
37-80387A68	TUBING	1.50/EA.	1.25
38-84184E01	BUTTON	3.00/EA.	2.10
38-84226L24	BUTTON	3.10/EA.	2.20
38-84402L42	BUTTON	.95/EA.	.65
38-84402L43	BUTTON	.95/EA.	.65
39-5458E01	CONTACT	3.55/PK.	2.48
40-82790D01	SWITCH	24.40 EA.	17.20
40-83271G07	SWITCH	22.00/EA.	15.50
40-84553A41	SWITCH, SLIDE	3.00/EA.	2.10
42-5297G02	STRAP	4.10/EA.	3.10
42-5297G03	STRAP	4.10/EA.	3.10
42-5360D01	STRAP, CARRYING	4.10/EA.	3.10
42-5832A01	STRAP	5.15/EA.	3.60
42-5857B01	STRAP	7.20/EA.	5.40
42-80385A59	WRIST STRAP	24.25/EA.	20.25
42-823572	CLAMP	24.75/EA.	17.25
42-82421J06	STRAP	6.20/EA.	4.65
42-82534J01	STRAP	3.10/EA.	2.35
42-82606H01	CLAMP	11.70/EA.	8.25
42-82608H01	STRAP, CARRYING	12.25/EA.	8.60
42-82637D05	CLIP	1.10/EA.	.75
42-82754B01	RING, RETAINING	1.45/PK./2	1.05
42-84117H01	STRAP	18.50/EA.	12.95
42-84542D01	RING	.90/EA.	.65
42-861093	CLAMP	5.45/PK./5	3.85
42-865599	BELT	12.25/EA.	9.20
47-5598C01	POST	1.50/EA.	1.05
48-124362	TRANSISTOR	8.00/EA.	5.25
48-134511	TRANSISTOR	6.46/EA.	4.52
48-134548	TRANSISTOR, GERMANIUM	5.46/EA.	3.82
48-134573	TRANSISTOR, GERMANIUM	2.72/EA.	1.50
48-134667	TRANSISTOR, SILC/SSP	1.89/EA.	1.04
48-134674	TRANSISTOR, SILC/SSP	1.83/EA.	1.10
48-134846	TRANSISTOR	2.33/EA.	1.40
48-137201	RECTIFIER	11.45/EA.	6.89
48-2064C08	DIODE	4.38/EA.	2.85
48-5174A01	DIODE, LIGHT EMITTING	3.73/EA.	2.05
48-5234C12	TRANSISTOR	4.85/EA.	3.15
48-5349C01	DIODE	1.31/EA.	.85
48-5474G06	SEMICONDUCTOR	1.93/EA.	1.16
48-5474G10	TRANSISTOR	3.39/EA.	2.37
48-5481E02	SEMICONDUCTOR	1.65/EA.	.91
48-800145	VARACTOR	35.01/EA.	24.51
48-80332A07	DIODE	27.55/EA.	19.25
48-80345A64	DIODE	2.27/EA.	1.25
48-803700	VARACATOR	45.50/EA.	31.85
48-82095C02	RECTIFIER	2.60/EA.	1.82
48-82256C20	DIODE, ZENER	3.46/EA.	2.25
48-82256C21	DIODE	3.58/EA.	2.15
48-82256C23	DIODE	1.88/EA.	1.13
48-82256C25	DIODE, ZENER	2.95/EA.	1.77
48-82256C26	DIODE, ZENER	2.65/EA.	1.60
48-82256C28	DIODE, ZENER	4.73/EA.	2.84
48-82256C33	DIODE, ZENER	2.50/EA.	1.50
48-82256C38	DIODE, ZENER	4.58/EA.	2.75
48-82256C39	DIODE, ZENER	2.96/EA.	1.63
48-82256C46	DIODE, ZENER	5.60/EA.	3.08
48-82256C50	DIODE, ZENER	3.92/EA.	2.35
48-82256C51	DIODE, ZENER	2.89/EA.	1.59
48-82256C53	DIODE, ZENER	2.67/EA.	1.60
48-82256C54	DIODE, ZENER	2.91/EA.	1.60
48-82256C55	DIODE, ZENER	3.27/EA.	1.80
48-82256C56	DIODE, ZENER	2.83/EA.	1.70
48-82256C58	DIODE, ZENER	2.80/EA.	1.54
48-82256C59	DIODE, ZENER	2.58/EA.	1.55
48-82256C63	DIODE, ZENER	1.63/EA.	.98
48-82363E04	DIODE	2.40/EA.	1.44
48-82392B03	DIODE, SILICON JUNCT	.80/EA.	.44
48-82466H13	RECTIFIER	.84/EA.	.53
48-82466H18	RECTIFIER	1.18/EA.	.65
48-82466H25	RECTIFIER	2.13/EA.	1.28
48-82525G01	RECTIFIER	1.30/EA.	.79
48-82617C01	TRANSISTOR, GERMANIUM	1.25/EA.	.75
48-83192A50	TRANSISTOR	7.79/EA.	5.45
48-83461E01	DIODE, ZENER	1.52/EA.	.91
48-83461E12	DIODE, ZENER	2.66/EA.	1.60
48-83461E18	DIODE, ZENER	3.08/EA.	1.85
48-83461E29	DIODE, ZENER	12.48/EA.	7.49
48-83461E48	DIODE, ZENER	1.73/EA.	.95
48-83591F01	RECTIFIER	9.00/EA.	5.40
48-83654H01	DIODE, SILICON JUNCT	.54/EA.	.30
48-83696E01	DIODE, ZENER	2.07/EA.	1.24
48-83696E04	DIODE, ZENER	2.07/EA.	1.24
48-83696E05	DIODE, ZENER	2.07/EA.	1.24
48-83696E06	DSIODE, ZENER	1.97/EA.	1.28
48-83696E15	DIODE, ZENER	4.55/EA.	2.73
48-83698E24	TRANSISTOR	3.92/EA.	3.15
48-83698E31	TRANSISTOR	3.58/EA.	2.15
48-83699E09	TRANSISTOR, GERMANIUM	7.80/EA.	5.45
48-83741C04	THYRISTOR	5.00/EA.	3.50
48-83750G03	TRANSISTOR, SILC/SSM	2.72/EA.	1.50
48-83875D05	THYRISTOR	3.63/EA.	2.00
48-84116F01	RESONATOR	26.29/EA.	18.40
48-84204D06	DIODE	5.64/EA.	3.95
48-84204D08	DIODE	8.50/EA.	5.95
48-84309A58	DIODE	3.69/EA.	2.58

Part No.	Description	User Price	NSO Price
48-84403F01	PHOTOCELL	3.81/EA.	2.67
48-84411L06	TRANSISTOR, POWER RF	28.57/EA.	20.00
48-84411L31	TRANSISTOR, POWER RF	10.45/EA.	5.75
48-84411L32	TRANSISTOR, POWER RF	14.81/EA.	8.15
48-84411L52	TANSISTOR	14.16/EA.	9.91
48-84463K02	DIODE	1.23/EA.	.74
48-84616A09	DIODE	1.93/PK./1	1.35
48-84621E08	RECTIFIER, BRIDGE	6.36/EA.	3.50
48-84755H01	THYRISTOR	.95/EA.	.52
48-84772B01	RECTIFIER, SILICON	1.20/EA.	.66
48-84956K02	RESONATOR	36.80/EA.	25.76
48-86850C76	DIODE, ZENER	7.27/EA.	4.36
48-86851C03	TRANSISTOR	6.49/EA.	4.22
48-86851C64	TRANSISTOR	1.71/EA.	1.20
48-869015	TRANSISTOR	5.09/EA.	2.80
48-869036	TRANSISTOR, SILC/SSM	2.50/EA.	1.50
48-869124	TRANSISTOR, SILC/SSM	3.09/EA.	1.70
48-869134	TRANSISTOR	6.26/EA.	4.38
48-869145	TRANSISTOR, SILC/SSM	1.51/EA.	.83
48-869148	TRANSISTOR	3.45/EA.	1.90
48-869166	TRANSISTOR, SILC/SSP	1.00/EA.	.55
48-869169	TRANSISTOR	2.72/EA.	1.50
48-869170	TRANSISTOR, SILC/SSM	2.81/EA.	1.55
48-869173	TRANSISTOR, SILC/SSM	1.71/EA.	.94
48-869197	TRANSISTOR, SILC/SSP	.55/EA.	.30
48-869203	TRANSISTOR	6.80/EA.	4.20
48-869224	TRANSISTOR	10.64/EA.	7.45
48-869225	TRANSISTOR, SILC/SPM	3.49/EA.	1.92
48-869237	TRANSISTOR, GERMANIUM	3.34/EA.	2.17
48-869244	TRANSISTOR, SILC/SPM	4.09/EA.	2.25
48-869252	TRANSISTOR, SILC/SSP	.55/EA.	.30
48-869257	TRANSISTOR, SILC/SSM	.91/EA.	.50
48-869266	TRANSISTOR, SILC/SSP	2.80/EA.	1.80
48-869297	TRANSISTOR	3.00/EA.	2.10
48-869301	TRANSISTOR	1.36/EA.	.75
48-869302	TRANSISTOR, SILC/SPM	4.09/EA.	2.25
48-869306	THYRISTOR	10.90/EA.	6.00
48-869307	TRANSISTOR, SILC/SSP	3.64/EA.	2.00
48-869315	TRANSISTOR, SILC/SSM	1.27/EA.	.70
48-869320	TRANSISTOR, SILC/SSM	2.30/EA.	1.27
48-869322	TRANSISTOR, SILC/SSP	1.45/EA.	.80
48-869348	TRANSISTOR, SILC/SPM	4.81/EA.	2.65
48-869350	TANSISTOR, SILC/SSP	.81/EA.	.45
48-869352	TRANSISTOR, SILC/SSM	2.09/EA.	1.15
8-869374	TRANSISTOR	4.54/EA.	2.50
8-869388	TRANSISTOR	4.73/EA.	2.84
48-869404	TRANSISTOR, SILC/SSP	1.42/EA.	.79
48-869411	TRANSISTOR, FET	2.36/EA.	1.30
48-869419	TRANSISTOR, SILC/SSM	1.54/EA.	.85
48-869426	TRANSISTOR, SILC/SSM	2.85/EA.	1.57
48-869427	TRANSISTOR, SILC/SSM	1.45/EA.	.80
48-869428	TRANSISTOR, SILC/SSM	1.81/EA.	1.00
48-869434	TRANSISTOR, SILC/SSP	.91/EA.	.50
48-869435	TRANSISTOR	1.73/EA.	.95
48-869439	TRANSISTOR, SILC/SSM	.91/EA.	.50
48-869440	TRANSISTOR, SILC/SSM	.91/EA.	.50
48-869447	TRANSISTOR, SILC/SSP	.58/EA.	.32
48-869456	TRANSISTOR, SILC/SSP	1.15/EA.	.63
48-869460	TRANSISTOR	4.20/EA.	2.94
48-869466	TRANSISTOR, SILC/SSM	3.63/EA.	2.00
48-869467	TRANSISTOR, SILC/SSP	1.45/EA.	.80
48-869475	TRANSISTOR, GERMANIUM	1.54/EA.	.85
48-869476	TRANSISTOR, GERMANIUM	1.71/EA.	.94
48-869477	TRANSISTOR	18.20/EA.	12.74
48-869491	TRANSISTOR, SILC/ SSM	1.64/EA.	.90
48-869494	TRANSISTOR, SILC/ SSP	1.89/EA.	1.04
48-869526	TRANSISTOR, SILC/ SSP	1.20/EA.	.78
48-869528	TRANSISTOR, SILC/ SSP	.89/EA.	.49
48-869533	TRANSISTOR, FET	11.14/EA.	7.24
48-869534	TRANSISTOR, SILC/SSP	1.54/EA.	.85
48-869539	TRANSISTOR, SILC/ SSP	.58/EA.	.32
48-869540	TRANSISTOR, SILC/ SPM	2.69/EA.	1.48
48-869543	TRANSISTOR, SILC/ SSP	.91/EA.	.50
48-869547	TRANSISTOR, SILC/ SSP	1.09/EA.	.60
48-869547	TRANSISTOR, SILC/SSP	1.09/EA.	.60
48-869548	TRANSISTOR, SILC/SSP	.91/EA.	.50
48-869549	TRANSISTOR, GERMANIUM	3.00/EA.	1.65
48-869551	TRANSISTOR, POWER RF	.91/EA.	.50
48-869552	TRANSISTOR, POWER RF	2.95/EA.	1.62
48-869553	TRANSISTOR	12.63/EA.	6.95
48-869568	TRANSISTOR, SILC/SSP	.91/EA.	.50
48-869576	TRANSISTOR, SILC/SPP	2.27/EA.	1.25
48-869579	TRANSISTOR	12.73/EA.	7.00
48-869582	TRANSISTOR, SILC/SPP	2.54/EA.	1.40
585	TRANSISTOR, POWER RF	22.00/EA.	12.10
9586	TRANSISTOR, POWER RF	23.81/EA.	13.10
48-869587	TRANSISTOR, POWER RF	14.72/EA.	8.10
48-869595	TRANSISTOR	2.00/EA.	1.10
48-869599	TRANSISTOR, POWER RF	5.90/EA.	3.25
48-869601	TRANSISTOR, SILC/SSP	1.91/EA.	1.05
48-869606	TRANSISTOR, SILC/ SSP	1.72/EA.	.95
48-869614	TRANSISTOR, GERMANIUM	10.00/EA.	5.00
48-869616	TRANSISTOR, POWER RF	30.54/EA.	16.80
48-869617	TRANSISTOR, POWER RF	30.54/EA.	16.80
48-869618	TRANSISTOR, SILC/SPP	2.67/EA.	1.47
48-869619	TRANSISTOR, SILC/SPP	2.18/EA.	1.20
48-869627	TRANSISTOR, SILC/ SPM	2.21/EA.	1.22
48-869630	TRANSISTOR, POWER RF	30.00/EA.	16.50
48-869633	TRANSISTORSILC/ SPP	6.18/EA.	3.40
48-869638	TRANSISTOR, SILC/SSP	1.16/EA.	.64
48-869640	TRANSISTOR, SILC/SPP	1.81/EA.	1.00
48-869641	TRANSISTOR, STLC/SPP	1.81/EA.	1.00
48-869642	TRANSISTOR, SILC/SSP	180/EA.	1.13
48-869643	TRANSISTOR, SILC/SSP	1.70/EA.	1.02
48-869645	TRANSISTOR, SILC/SPP	2.54/EA.	1.40
48-869646	TRANSISTOR, SILC/SPP	2.27/EA.	1.25
48-869647	TRANSISTOR, SILC/SPP	1.52/EA.	.84
48-869648	TRANSISTOR, SILC/SSP	.91/EA.	.50
48-869649	TRANSISTOR, SILC/SSP	.91/EA.	.50
48-869651	TRANSISTOR, FET	1.53/EA.	.84
48-869652	TRANSISTOR, FET	1.44/EA.	.79
48-869653	TRANSISTOR, FET	1.27/EA.	.70
48-869654	TRANSISTOR, POWER RF	2.96/EA.	1.63
48-869656	TRANSISTOR, POWER RF	27.72/EA.	15.25
48-869662	TRANSISTOR, SILC/ SSP	1.09/EA.	.60
48-869663	TRANSISTOR, SILC/ SSP	1.00/EA.	.55
48-869674	RECTIFIER	19.09/EA.	10.50
48-869677	TRANSISTOR, SILC/SPP	2.18/EA.	1.20
48-869681	TRANSISTOR, SILC/ SSP	.91/EA.	.50
48-869688	TRANSISTOR, POWER RF	33.63/EA.	18.50
48-869691	TRANSISTOR, POWER RF	31.81/EA.	17.50
48-869696	TRANSISTOR, POWER RF	12.34/EA.	8.64
48-869697	TRANSISTOR, POWER RF	12.43/EA.	8.08
48-869701	TRANSISTOR, SILC/ SPM	3.72/EA.	2.05
48-869703	TRANSISTOR, POWER RF	2.45/EA.	1.35
48-869719	TRANSISTOR	26.18/EA.	14.40
48-869720	TRANSISTOR, POWER RF	33.45/EA.	18.40
48-869725	TRANSISTOR, FET	1.71/EA.	.94
48-869736	TRANSISTOR, POWER RF	14.60/EA.	8.03
48-869737	TRANSISTOR, POWER RF	13.27/EA.	7.30
48-869740	TRANSISTOR, POWER RF	58.08/EA.	34.85
48-869776	TRANSISTOR, POWER RF	2.18/EA.	1.20
48-869777	TRANSISTOR	.82/EA.	.45
48-869780	TRANSISTOR, POWER RF	11.36/EA.	6.25
48-869787	TRANSISTOR, SILC/ SSP	1.42/EA.	.78
48-869806	TRANSISTOR, SILC/ SPP	1.62/EA.	.89
48-869807	TRANSISTOR, SILC/ SPP	2.18/EA.	1.20
48-869823	TRANSISTOR, SILC/ SSP	1.72/EA.	.95
48-869839	TRANSISTOR, FET	8.50/EA.	5.15
48-869850	TRANSISTOR, POWER RF	28.45/EA.	15.65
48-869851	TRANSISTOR, POWER RF	34.36/EA.	18.90
48-869859	TRANSISTOR, POWER RF	5.25/EA.	2.89
48-869875	TRANSISTOR	38.18/EA.	21.00
48-869876	TRANSISTOR, POWER RF	52.73/EA.	29.00
48-869877	TRANSISTOR, POWER RF	63.64/EA.	35.00
48-869887	TRANSISTOR, POWER RF	5.91/EA.	3.25
48-869888	TRANSISTOR, POWER RF	13.27/EA.	7.30
48-869898	TRANSISTOR, POWER RF	32.54/EA.	17.90
48-869903	SEMICONDUCTOR	461.55/EA.	300.00
48-869906	TRANSISTOR, POWER RF	5.96/EA.	3.28
48-869977	TRANSISTOR	16.65/EA.	11.65
49-80374A64	THUMB WHEEL	5.20/EA.	3.70
50-5178K01	EARPHONE	19.50/EA.	14.65
50-82202A03	EARPIECE	25.25/EA.	25.25
50-82433G01	HANDSET	68.00/EA.	47.60
50-83693B04	EARPIECE	23.75/EA.	21.25
50-83851B01	EARPIECE	3.00/EA.	2.10
50-83851B02	EARPIECE	3.00/EA.	2.10
50-84105C01	SPEAKER	22.00/EA.	15.00
50-84972H01	HEADSET	177.00/EA.	124.00
51-10834A02	I.C.	5.30/EA.	3.70
51-5M01	I.C.	11.86/EA.	8.30
51-5144J02	MODULE	4.32/EA.	2.81
51-5144J05	MODULE	19.94/EA.	13.96
51-5144J06	MODULE	19.94/EA.	13.96
51-5177D78	I.C.	10.08/EA.	6.55
51-5192E10	HYBRID CIRCUIT	20.00/EA.	14.00
51-5192E46	MODULE	63.93/EA.	44.75
51-5337F41	MODULE	3.86/EA.	2.70
51-5467G02	I.C.	4.64/EA.	3.71
51-5467G03	I.C./MOS	10.10/EA.	7.07
51-5467G04	I.C./MOS	7.60/EA.	5.32
51-5467G05	I.C./MOS	5.66/EA.	3.96
51-5467G07	I.C./MOS	14.39/EA.	10.07
51-5468G01	I.C.	25.71/EA.	18.00
51-80135C01	I.C.	2.83/EA.	1.98
51-82070H04	I.C.	3.40/EA.	2.35
51-82070H07	I.C.	4.26/EA.	3.77
51-82070H08	I.C.	3.86/EA.	2.70
51-82070H12	I.C.	1.85/EA.	1.20
51-82822F04	I.C./MOS	16.90/EA.	10.00
51-82822F06	INTEGRATED CKT/SMD	17.73/EA.	9.75
51-82822F21	INTEGRATED CKT/SMO	22.31/EA.	14.50
51-82822F31	INTEGRATED CKT/SMO	11.78/EA.	7.07
51-82822F46	I.C./MOS	4.69 /EA.	3.05
51-82822F48	I.C./MOS	1.85/EA.	1.02
51-82822F55	INTEGRATED CKT/SMO	7.55/EA.	4.15
51-82848M30	I.C.	1.05/EA.	.68
51-82848M31	I.C.	1.06/EA.	.74
51-82848M32	I.C./MOS	1.05/EA.	.68
51-82848M40	I.C.	38.87/EA.	27.21
51-82884L47	INTEGRATED CKT/SMO	1.26/EA.	.88
51-82884L72	INTEGRATED CKT/MOS	4.57/EA.	3.20
51-83081F03	I.C.	28.00/EA.	19.60
51-83081F07	I.C.	7.93/EA.	5.55
51-83625M18	I.C.	73.50/EA.	55.00
51-83627M06	I.C.	1.05/EA.	.75
51-83629M12	:I.C.	2.14/EA.	1.50
51-83629M28	INTEGRATED CKT/SLI	3.73/EA.	2.05
51-84084D79	COUNTER BOARD	2.64/EA.	1.45
51-84118K01	I.C.	1.36/EA.	.95
51-84118K51	INTEGRATED CKT/TTL	2.04/EA.	1.43
51-84118K54	INTEGRATED CKT/TTL	1.24/EA.	.87
51-84200D69	I.C.	5.10/EA.	3.55
51-84204D37	I.C.	37.45/EA.	26.20
51-84209D12	I.C.	2.44/EA.	1.71
51-84248D15	I.C.	2.43/EA.	1.70
51-84312837	RE MODULE/HYBRID	100.81/EA.	70.57
51-84320A04	INTEGRATED CKT/MOS	6.70/EA.	4.70
51-84320A09	INTEGRATED CKT/MOS	4.50/EA.	3.15
51-84320A70	INTEGRATED CKT/SLI	17.75/EA.	11.53
51-84333G70	NETWORK	3.61/EA.	2.53
51-84333G87	ACTIVE FILTER	62.39/EA.	43.67
51-84333G89	FILTER	62.39/EA.	52.40
51-84371K51	I.C.	4.07/EA.	2.85
51-84425D01	I.C.	5.60/EA.	3.92
51-84561L38	I.C.	1.62/PK./13	1.05
51-84561L49	I.C.	1.18/EA.	.77
51-84561L74	I.C.	26.50/EA.	18.55
51-84621K28	INTEGRATED CKT/SLI	5.89/EA.	4.12
51-84623H01	I.C.	2.88/EA.	1.87
51-84688D12	INTEGRATED CKT/TTL	3.75/EA.	2.61
51-84768F31	I.C./MOS	13.60/EA.	9.52
51-84792E05	I.C.	1.15/EA.	.75
51-84805E09	I.C.	7.07/EA.	4.95
51-84805E29	I.C.	15.22/EA.	9.89
51-84887K79	INTEGRATED CKT/SMO	.77/EA.	.54
51-866969	HEATSINK	15.46/EA.	10.05
54-5422D01	LABEL	25.10/PK./1	17.65
54-83331A01	LABEL	20.95/PK./42	14.75
55-5717E01	KLEY	1.05/EA.	.75
56-84148L01	BAG, PROTECTIVE	10.25/EA.	7.25
60-5128G01	BAT/NICKEL CADMIUM	93.75/EA.	61.60
60-5160G01	BAT/NICKEL CADMIUM	31.00/EA.	21.00
60-5201E03	BATTERY, RAPID CHARGE	88.50/EA.	42.00
60-5201E04	BATTERY, RAPID CHARGE	144.00/EA.	98.00
60-5201E05	BATTERY, RAPID CHARGE	113.00/EA.	52.50
60-5201E06	BATTERY, RAPID CHARGE	96.75/EA.	43.00
60-5232J01	BATTERY, MERCURY	38.00/EA.	22.00
60-5295A03	BATTERY, DUAL CHARGE	102.00/EA.	74.00
60-5310A01	BATTERY, ALKALINE	3.20/PK./4	2.25
60-5433F01	BAT/NICKEL CADMIUM	278.00/EA.	189.00
60-5726G01	BAT/NICKEL CADMIUM	89.50/EA.	61.00
60-5737E01	BATTERY, DUAL CHARGE	62.00/EA.	38.00
60-5742E01	BATTERY, DUAL CHARGE	77.25/EA.	46.50
60-5928J01	BATTERY, RAPID CHARGE	66.00/EA.	44.75
60-5928J02	BATTERY, RAPID CHARGE	58.75/EA.	40.00
60-5928J03	BAT/NICKEL CADMIUM	59.75/EA.	40.50
60-5928J04	BAT/NICKEL CADMIUM	51.50/EA.	35.00
60-5928J05	BATTERY, RAPID CHARGE	106.00/EA.	72.00
60-5943J01	BATTERY, ALKALINE	13.50/EA.	9.10
60-5943J02	BAT, ALKALINE HT90	13.50/EA.	9.10
60-5945J01	BATTERY, MERCURY	40.25/EA.	27.25
60-5945J02	BATTERY, MERCURY HT90	40.25/EA.	27.25
60-60930A01	BATTERY, RAPID CHARGE	96.75/EA.	52.00
60-60930A02	BATTERY, RAPID CHARGE	113.00/EA.	60.00
60-82324J01	BAT/NICKEL CADMIUM	48.50/EA.	27.00
60-82325J01	BATTERY, MERCURY	22.75/EA.	16.50
60-82387J01	BATTERY, RAPID CHARGE	54.50/EA.	30.00
60-82389J01	BATTERY, ALKALINE	8.75/PK./10	5.60
60-83009H02/R	BAT/NICKEL CADMIUM	7.85/EA.	6.25
60-83062J01	BATTERY, ALKALINE	11.25/EA.	8.00
60-83076E01	BATTERY	6.20/EA.	3.24
60-83420D01	BAT/NICKEL CADMIUM	190.00/EA.	129.00
60-83582H01	BATTERY, MERCURY	17.50/EA.	12.50
60-83605E01	BAT/NICKEL CADMIUM	43.00/EA.	35.00
60-84184H02	BAT/NICKEL CADMIUM	57.50/EA.	46.20
60-84342H01	BATTERY, MERCURY	23.75/EA.	16.00
60-84636H01	BATTERY, RAPID CHARGE	72.00/EA.	32.20
60-84641H01	BATTERY, RAPID CHARGE	57.75/EA.	30.00

Part No.	Description	User Price	NSO Price
60-84642H01	BAT NICKEL CADMIUM	66.00/EA.	32.20
60-84643H01	BAT NICKEL CADMIUM	52.50/EA.	25.50
60-84815H01	BATTERY. MERCURY	41.25/EA.	30.00
61-80374A65	GUIDE	3.85/EA.	2.70
64-82723K01	PLATE	78.95/EA.	55.60
64-83451K01	PLATE	12.10/PK./10	8.55
64-84145M01	PANEL	2.15/EA.	1.55
64-84145M02	PANEL	2.15/EA.	1.55
65-82085D01	LAMP Z	18.70/EA.	13.20
65-82840G01	BULB	3.10/EA.	2.20
65-84258C75	BULB	40.80/EA.	28.75
65-88490A02	FUSE	1.60/EA.	1.15
66-5792L01	SPECIALITY TOOL	2.75/EA.	2.35
66-80385A03	BRUSH. REFILL	.55/EA.	.45
66-80387A55	SOLDER IRON TIP	33.00 PK./10	28.00
66-80387A56	SOLDER IRON TIP	33.00/PK./10	28.00
66-80387A57	SOLDER IRON TIP	33.00/PK./10	28.00
66-80387A58	SOLDER IRON TIP	33.00 PK./10	28.00
66-80387A59	CIRCUIT EXTRACTOR	132.00/EA.	112.00
66-80387A60	CHIP EXTRACTOR	170.00/EA.	145.00
66-80387A61	CHIP EXTRACTOR	170.00/EA.	145.00
66-80387A62	CHIP EXTRACTOR	170.00/EA.	145.00
66-80387A63	CHIP EXTRACTOR	170.00/EA.	145.00
66-80387A64	SAFETY STAND	88.00/EA.	75.00
66-80387A65	PROTECTIVE STAND	17.45/EA.	14.80
68-856360	MANUAL	7.00/EA.	7.00
75-84180K02	BUMPER	3.45/PK./25	2.45
80-82623F01	RELAY	17.50/EA.	12.25
80-82624F01	LATCH. MAGNETIC	24.75/EA.	17.50
80-83802D01	RELAY	44.85/EA.	31.57
80-84201A01	RELAY	35.50/EA.	24.85
80-84560A73	RELAY	40.40/EA.	28.45
80-84654C01	RELAY	323.35/EA.	227.75
84-83014H01	BOARD, CIRCUIT	14.75/EA.	10.40
84-84365C01	BOARD, CIRCUIT	10.10/EA.	7.10
85-5146B03	ANT UHF HELICAL	8.50/EA.	4.25
85-5146B04	ANT UHF HELICAL	8.50/EA.	4.25
85-5146B05	ANT UHF HELICAL	8.50/EA.	4.25
85-5268F01	ANT UHF FLEXIBLE	8.50/EA.	4.25
85-5491J01	NAT H/B HELICAL	8.50/EA.	4.25
85-5491J02	ANT H/B HELICAL	8.50/EA.	4.25
85-5491J03	ANT H/B HELICAL	8.50/EA.	4.25
85-5491J04	ANT UHF HELICAL	8.50/EA.	4.25
85-5491J05	ANT UHF HELICAL	8.50/EA.	4.25
85-5491J06	ANT UHF HELICAL	8.50/EA.	4.25
85-82283J01	ANT H/B HELICAL	8.50/EA.	4.25
85-82283J02	ANT H/B HELICAL	8.50/EA.	4.25
85-82283J05	ANT H/B HELICAL	8.50/EA.	4.25
85-82283J06	ANT H/B HELICAL	8.50/EA.	4.25
96-2500A14	TUBE	93.30/EA.	67.10

PAGER MODULE PRICE SCHEDULE

PART NUMBER	DESCRIPTION	STANDARD PRICE	EXCHANGE PRICE	NSO STANDARD PRICE	NSO EXCHANGE PRICE
01-5952A99	Module	$29.65	$14.00	$20.75	$11.00
51-5192E01	Module	23.60	14.00	16.50	11.00
51-5192E03	Module	23.95	14.00	16.75	11.00
51-5192E19	Module	31.45	17.00	22.00	12.50
51-5192E21	Module	8.35	4.50	5.85	3.50
51-5192E22	Module	52.10	17.00	36.45	12.50
51-5192E25	ORDER PK-814	—	—	—	—
51-5192E26	Module, BPR2000	14.00	7.50	9.80	5.25
51-5192E34	ORDER RPX-4405A	—	—	—	—
51-5192E39	Module, BPR2000	10.75	7.50	7.50	5.25
51-5192E46	Module, BPR2000	55.00	17.00	39.00	12.50
51-5192E47	Module, BPR2000	55.00	17.00	39.00	12.50
51-5479G03	Module, BPR2000	11.00	7.50	7.75	5.25
51-5917C04	Module	30.70	17.00	21.50	12.50
51-84267A78	Module	5.35	4.50	3.75	3.50
51-84312B02	ORDER 51-84312B75	—	—	—	—
51-84312B03	Module	26.10	14.00	18.25	11.00
51-84312B04	Module	28.20	14.00	19.75	11.00
51-84312B05	ORDER PK-814	—	—	—	—
51-84312B06	ORDER 51-84333G59	—	—	—	—
51-84312B07	Module	26.10	14.00	18.25	11.00
51-84312B08	Module	29.60	14.00	20.70	11.00
51-84312B09	Module	23.60	14.00	16.50	11.00
51-84312B10	Module	29.60	14.00	20.70	11.00
51-84312B12	Module/CMOS	36.45	17.00	25.50	12.50
51-84312B13	ORDER PK-810	—	—	—	—
51-84312B14	ORDER NLN-8192A	—	—	—	—
51-84312B15	Module/CMOS	35.00	17.00	24.50	12.50
51-84312B53	Module	26.10	14.00	18.25	11.00
51-84312B54	NO LONGER AVAILABLE	—	—	—	—
51-84312B75	Module	21.45	14.00	15.00	11.00
51-84312B94	ORDER PK-814	—	—	—	—
51-84333G01	ORDER 51-84312B75	—	—	—	—
51-84333G05	ORDER PK-814	—	—	—	—

PAGER MODULE PRICE SCHEDULE (Continued)

PART NUMBER	DESCRIPTION	STANDARD PRICE	EXCHANGE PRICE	NSO STANDARD PRICE	NSO EXCHANGE PRICE
51-84333G06	Module	29.60	14.00	20.70	11.00
51-84333G07	Module	27.10	14.00	18.95	11.00
51-84333G08	Module	23.60	14.00	16.50	11.00
51-84333G15	ORDER PK-811	—	—	—	—
51-84333G16	Module/CMOS	42.45	17.00	29.70	12.50
51-84333G18	ORDER PK-812	—	—	—	—
51-84333G19	ORDER NLN-8192A	—	—	—	—
51-84333G20	ORDER 51-84312B15	—	—	—	—
51-84333G22	ORDER PK-761	—	—	—	—
51-84333G27	ORDER NLN-4658A	—	—	—	—
51-84333G31	Module	27.10	14.00	18.95	11.00
51-84333G32	Module	9.35	4.50	6.55	3.50
51-84333G34	ORDER NLN-8915A	—	—	—	—
51-84333G35	Module/CMOS	35.00	17.00	24.50	12.50
51-84333G36	ORDER PK-813	—	—	—	—
51-84333G37	ORDER PK-814	—	—	—	—
51-84333G50	Module	23.60	14.00	16.50	11.00
51-84333G53	ORDER PK-814	—	—	—	—
51-84333G54	Module/CMOS	32.85	17.00	23.00	12.50
51-84333G59	Module	42.45	17.00	29.70	12.50
51-84333G61	Module	35.00	17.00	24.50	12.50
51-84333G63	Module	41.20	17.00	28.85	12.50
51-84333G71	ORDER NLN-4658A	—	—	—	—
51-84333G72	Module	29.60	14.00	20.70	11.00
51-84333G73	Module	37.50	17.00	26.25	12.50
51-84333G75	ORDER NLN-4658A	—	—	—	—
51-84768F19	Module	$ 6.80	$ 4.50	$ 4.75	$ 3.50
51-84768F20	Module	28.60	14.00	20.00	11.00
51-84768F21	ORDER NLN-4150A	—	—	—	—
51-84768F25	Module	35.00	17.00	24.50	12.50
51-84768F27	ORDER NLN-5034A	—	—	—	—
51-84768F28	Module/CMOS	9.65	4.50	6.75	3.50
51-84768F35	Module	24.30	14.00	17.00	11.00
51-84768F40	Module/CMOS	7.80	4.50	5.45	3.50
51-84768F74	Module, BPR2000	22.95	14.00	16.05	11.00
NLN-4150A	Module, AGC Metrx, Blank	15.00	11.00	10.50	8.00
NLN-4327A	Module, AGC Metrx, Programmed	18.00	14.00	12.60	11.00
NLN-4658A	Module, TEC Metro, Blank	18.00	11.00	12.60	8.00
NLN-4701A	Module, TEC Metro, Programmed	21.00	14.00	14.70	11.00
NLN-4702A	Module, Programmed	21.00	14.00	14.70	11.00
NLN-5034A	Module, BHC Metrx, Blank	15.00	11.00	10.50	8.00
NLN-8192A	Module, MEC 5 Tone, Blank	16.50	11.00	11.55	8.00
NLN-8515A	Module, MEC 5 Tone, Programmed	19.75	14.00	13.85	11.00
NLN-8630A	ORDER NLN-4701A	—	—	—	—
NLN-8635A	ORDER NLN-4702A	—	—	—	—
NLN-8915A	Module, MAC Metro, Blank	15.00	11.00	10.50	8.00
NLN-8918A	Module, MAC Metro, Programmed	18.00	14.00	12.60	11.00
PK-761	Module	29.65	14.00	20.75	11.00
PK-810	Module	14.30	7.50	10.00	5.25
PK-811	Module	26.10	14.00	18.25	11.00
PK-812	Module	26.10	14.00	18.25	11.00
PK-813	Module	21.45	14.00	15.00	11.00
PK-814	Module	26.10	14.00	18.25	11.00
RPX-4037A	ORDER 51-84333G59	—	—	—	—
RPX-4405A	Module, BPR2000 Tone and Voice, and Tone Only	10.75	7.50	7.50	5.25

JACKETED HELIAX TRANSMISSION LINE KITS

ITEM NUMBER	DESCRIPTION	USER	NSO
TDN-6596A	Transmission Line Kit	$ 87.50 + 1.70/ft.	$ 65.75 + 1.19/ft.
TDN-6597A	Transmission Line Kit	90.75 + 1.70/ft.	68.00 + 1.19/ft.
TDN-6599A	Transmission Line Kit	95.75 + 1.70/ft.	71.75 + 1.19/ft.
TDN-6600A	Transmission Line Kit	194.00 + 4.43/ft.	146.00 + 3.10/ft.
TDN-6601A	Transmission Line Kit	197.00 + 4.43/ft.	148.00 + 3.10/ft.
TDN-6602A	Transmission Line Kit	208.00 + 4.43/ft.	156.00 + 3.10/ft.
TDN-6604A	Transmission Line Kit	270.00 + 5.20/ft.	203.00 + 3.64/ft.
TDN-6605A	Transmission Line Kit	273.00 + 5.20/ft.	205.00 + 3.64/ft.
TDN-6606A	Transmission Line Kit	268.00 + 5.20/ft.	201.00 + 3.64/ft.
30-80329A22	½" LDF Foam Cable	1.70/ft.	1.19/ft.
30-80329A23	⅞" LDF Foam Cable	4.43/ft.	3.10/ft.
30-82954C02	⅞" Air Heliax Cable	5.20/ft.	3.64/ft.
01-80306A60	Jumper Assembly	46.00	34.00
01-80306A61	Jumper Assembly	48.50	36.00
01-80306A62	Jumper Assembly	51.00	38.00
01-80306A64	Main Transmission Line Asseembly	36.00 + 1.70/ft.	27.00 + 1.19/ft.
01-80306A65	Main Transmission Line Assembly	38.50 + 1.70/ft.	29.00 + 1.19/ft.
01-80306A67	Main Transmission Line Assembly	41.00 + 1.70/ft.	31.00 + 1.19/ft.
01-80306A69	Main Transmission Line Assembly	97.00 + 4.43/ft.	73.00 + 3.10/ft.
01-80306A70	Main Transmission Line Assembly	103.00 + 4.43/ft.	77.50 + 3.10/ft.
01-82953C07	Main Transmission Line Assembly	122.00 + 5.20/ft.	91.50 + 3.64/ft.
01-82953C08	Main Transmission Line Assembly	122.00 + 5.20/ft.	91.50 + 3.64/ft.
01-84605A01	Jumper	47.75	35.75
01-84605A02	Jumper	52.50	39.75
ST-943	Connector	61.00	45.75
ST-944	Connector	61.00	45.75
ST-945	Valve & Gauge Assembly	39.00	29.25
ST-959	Connector	4.00	3.00
RRX-4005A	Connector	18.00	13.50
RRX-4006A	Connector	18.00	13.50
RRX-4007A	Connector	20.50	15.50
RRX-4008A	Connector	20.50	15.50
RRX-4011A	Connector	51.50	38.75
RRX-4012A	Connector	48.50	36.50
28-82021G01	Connector	1.60	1.15

TUBES

The following tubes represent the Motorola Communications and Electronics Parts *standard* tube offering. Other tubes are available on special order. Please contact your Motorola Parts Representative for availability, price and delivery.

RECEIVING TUBES

TYPE	USER	NSO
2C39A (Use 197-119A01)		
5R4GB	$ 7.30	$ 5.10
5Y3GT	5.00	3.50
6AB4	4.25	2.95
6AF4A	6.15	4.30
6AK5	5.40	3.75
6AK6	3.95	2.75
6AL5	3.50	2.45
6AN8A	5.15	3.60
6AQ5A	3.45	2.40
6AU6	3.80	2.65
6BA6	3.85	2.70
6BC4	9.30	6.50
6BC5/6CE5	4.90	3.45
6BE6	5.00	3.50
6BH6	4.10	2.85
6BJ6	4.10	3.05
6C4	4.25	2.95
6CB6A	3.45	2.40
6CF6 (Use 6CB6A)		
6CL6	5.25	3.65
6CL8A	5.25	3.65
6CY5	6.10	4.25
6DJ8	5.25	3.65
6EA8	4.00	2.80
6EV5	6.10	4.25
6FG6	4.50	3.15
6GH8A	4.15	2.90
6U8	4.00	2.80
7C5	14.30	10.00
7C7	17.90	12.50
12AB5	5.40	3.75
12AT7 (Use 12AT78M)		
12AT78M	3.50	2.45
12AU7A	3.15	2.20
12AX7	3.15	2.20
12BH7A	5.25	3.65
12BR7	6.10	4.25
12BY7A (Use 65-83735A02)		

SPECIAL PURPOSE TUBES

TYPE	USER	NSO
CK5678	33.50	23.45
OB2	4.45	3.10
ML2C39WA (Use 197-119A01)		
2E26	12.50	8.75
3B28	27.75	19.40
4CX250B	80.40	56.25
4657	116.10	81.25
5654	5.15	3.60
5894B*	78.60	55.00
5963	4.30	3.00
6146 (Use 8298)		
6360	10.80	7.60
6661 (Use 6BH6)		
6662 (Use 6BJ6)		
6679 (Use 12AT78M)		
6681 (Use 12AX7)		
6883 (Use 8552)		
6897 (Use 197-119A01)		
6907	$ 112.90	$ 79.00
6939	34.10	24.00
7054 (Use 8077/7054)		
7056	4.90	3.45
7058	8.15	5.70
7059	7.00	4.90
7060	7.90	5.55
7167	4.25	2.95
7258	7.40	5.20
7551	8.95	6.25
7558	8.90	6.25
7735AM (Use 97-82456F01)		
7984	17.75	12.50
8032 (Use 8552)		
8042	42.90	30.00
8072 (Use 4657)		
8077/7054	5.50	3.85
8106	7.20	5.05
8156	17.05	12.00
8298	11.10	7.85
8448 (Use 6EA8)		
8446 (Use 6CL8A)		
8447 (Use 12BR7)		
8458	43.80	30.65
8489 (Use 6AN8A)		
8552	14.20	10.00
8560 (Use 65-83382D02)		
8643 (Use 97-136A01)		

*Graded Tube

SPECIAL MOTOROLA NUMBERS

TYPE	USER	NSO
65-82292D01 (Use 97-82456F01)		
65-83382D02	92.00	64.40
65-83735A02	4.50	3.15
91-83922F01	61.45	43.00
97-136A01	119.95	83.95
97-136A02	134.30	94.00
97-82456F01	102.10	71.45
197-119A01 (Replaces 2C39A, ML2C39WA, and 6897)	236.45	165.50

KLYSTRONS (MICROWAVE)

TYPE	USER	NSO
65-85299C02	1896.45	1327.50
65-85299C03	1896.45	1327.50
65-85299C04	1896.45	1327.50
65-86160A01	794.30	556.00
65-86190C01	342.90	240.00
65-86190C02	350.00	245.00
65-89003A01	1428.00	1000.00

MOTOROLA TEST EQUIPMENT PRODUCTS

A significant number of new Test Equipment Products have been added to our product line. At the same time we are cancelling a number of older and obsolete products. There are also several price adjustments reflecting higher costs. The new products, cancelled products and price adjustments are listed for your information.

NEW PRODUCTS

		NSO Price	User Price
R-1012C	DVP TEST SET	2140.00	2140.00
R-1032A	DES TEST SET	2140.00	2140.00
R-1033A	METERING POINT TEST SET	480.00	480.00
RTK-4028A	CABLE	60.00	60.00
RTK-4043A	CABLE	60.00	60.00
RTK-4044A	CABLE	60.00	60.00
RTK-4046A	CABLE	60.00	60.00
RTK-4047A	CABLE	60.00	60.00
RTL-4118A	MODULE FOR R-2001	480.00	480.00
RTL-4119A	MODULE FOR R-2200	480.00	480.00
R-1034A	CONTROL LINE TESTER	450.00	450.00
R-2001C	COMMUNICATIONS SYSTEM ANALYZER	14365.00	14365.00
R-2001C/HS	COMMUNICATIONS SYSTEM ANALYZER	15040.00	15040.00
R-2001C/HS/220	COMMUNICATIONS SYSTEM ANALYZER	15040.00	15040.00
R-2001C/220	COMMUNICATIONS SYSTEM ANALYZER	14365.00	14365.00
R-2002C	COMMUNICATIONS SYSTEM ANALYZER	18185.00	18185.00
R-2002C/HS	COMMUNICATIONS SYSTEM ANALYZER	18860.00	18860.00
R-2002C/HS/220	COMMUNICATIONS SYSTEM ANALYZER	18860.00	18860.00
R-2002C/220	COMMUNICATIONS SYSTEM ANALYZER	18185.00	18185.00
R-2200A	COMMUNICATIONS SERVICE MONITOR	8900.00	8900.00
R-2200A/HS	COMMUNICATIONS SERVICE MONITOR	9400.00	9400.00
R-2200A/220	COMMUNICATIONS SERVICE MONITOR	8900.00	8900.00
R-2200A/HS/220	COMMUNICATIONS SERVICE MONITOR	9400.00	9400.00
RTL-4114A	PROTECTIVE COVER	60.00	60.00
RTL-4115A	TRANSIT CASE	375.00	375.00
RTP-4239A	BATTERY PACK	100.00	100.00

R-1800 DIGITAL ANALYZER CONTROLLER APPLICATIONS

RPX-4206A	TEST PACKAGE	425.00	425.00
RPX-4199A	TEST PACKAGE	425.00	425.00
RPX-4207A	TEST PACKAGE	450.00	450.00
RTK-4041A	CABLE	60.00	60.00
RTK-4053A	CABLE	80.00	80.00
RTK-4054A	CABLE	80.00	80.00
RTL-4809A	APPLICATION PROGRAM KIT	124.00	124.00
RTL-4814A	APPLICATION PROGRAM KIT	124.00	124.00
RTL-4816A	GSC ENCODER	400.00	400.00
RTL-4817A	APPLICATION PROGRAM KIT	58.00	58.00
RTL-4820A	APPLICATION PROGRAM KIT	124.00	124.00
RTL-5805A	ADAPTOR BOARD	96.00	96.00
RTL-5808A	ADAPTOR BOARD	68.00	68.00
RTL-5821A	ADAPTOR BOARD	68.00	68.00
RTL-5827A	ADAPTOR BOARD	68.00	68.00

PRICE ADJUSTMENTS

NKN-6099A	ADAPTOR	45.00	45.00
R-1020A	SIGNAL GENERATOR	4800.00	4800.00
R-1020A/230	SIGNAL GENERATOR	4800.00	4800.00
S-1053D	AC VOLTMETER	500.00	500.00
S-1067B	AUDIO OSCELLATOR	450.00	450.00
SKN-6012A	CABLE	70.00	70.00
SKN-6013A	CABLE	60.00	60.00
SKN-6030A	CABLE	80.00	80.00
TEK-37A	CABLE	100.00	100.00
TEKA-72A	CABLE	30.00	30.00
TEKA-74A	ADAPTOR	25.00	25.00
TKN-6025A	ADAPTOR	40.00	40.00

CANCELLATIONS

S1056 SERIES METERING POINT TEST SET:

S-1056C
S-1057C
S-1058C
S-1059C
SLN-6057C
S-1062C
TEK-28A
P-7208A
S-1361A
SLN-1000C

R-1200 SERIES SERVICE MONITOR

All models are cancelled. Plug-ins are anticipated to be available through year end 1983. They will become NLA upon depletion of stock.

COMMUNICATIONS GROUP PARTS DEPARTMENT